Managing Osteoporosis

A Nova Scotia Approach

Report
of the
Provincial
Osteoporosis
Committee

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NOVA SCOTIA
Department of Health

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"I have become quite depressed since I broke my arm and pelvis.
I am 82 years old yet I feel like a dependent child again.
I wish that I had known more about what it really means
to have osteoporosis before my fall happened."

— Mrs. D., Patient with Osteoporosis

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Executive Summary

Osteoporosis is a common metabolic bone disease affecting an estimated 30% of women and 12.5% of men over the age of 50 (1). Although not the sole cause of fracture, osteoporosis is a major determinant of fracture risk. Hip fractures, in particular, are a devastating injury with mortality in the first year after fracture approaching 20% (2). In Nova Scotia, hip fractures constitute, on average, 64% of the 1683 total fractures in the province, resulting in the use of 22,124 inpatient hospital days annually (Table 1). Early identification and appropriate treatment of the disease is considered to be a key strategy in reducing the risks of fractures.

Bone densitometry, the principal diagnostic tool in osteoporosis, continues to be the most effective and accurate measure for the identification and monitoring of the disease (3). The role and use of peripheral devices, such as ultrasonometry, identified as an additional diagnostic tool, was reviewed. In reviewing the current evidence, ultrasound as a screening or diagnostic tool to identify risk factors in osteoporosis was not recommended at this time. The capacity to respond to the needs of this population has been significantly challenged with limited availability of bone densitometry machines in the province. Until 1999, there was only one machine, located at the QEII in Halifax, to provide diagnostic services for the province. An additional machine at Fishermen's Memorial in Lunenburg, purchased in 1999 and at Colchester Regional in Truro in 2001, has provided additional capacity and improved access for residents within the province. Currently, individual clinicians within each of the facilities determine the appropriate use of bone densitometry.

Beginning in July 1997, the Department of Health has invested considerable time and resources in an attempt to address the growing demand for diagnostic services, specifically bone densitometry, in the province. Committees, whose membership reflected the clinical experts in the field, were established to make recommendations on how patients, who were at risk for osteoporosis, should be assessed, diagnosed and treated in Nova Scotia (3). The report recommended the addition of at least five new densitometry units to improve access, the development of province wide screening guidelines and the review of current practice guidelines for the treatment of osteoporosis. In the spring of 1999, approval for the introduction of two mobile bone densitometry machines was publicly announced and a committee was established to develop the plan. The committee was dissolved in August 1999 without a final report completed.

In June 2001, the Department of Health, reviewing and building on the previous work completed, established a provincial committee, to develop a provincial approach that would coordinate and integrate health services from prevention to treatment to the population at risk or who have osteoporosis. This approach was to be developed with

the understanding that two (2) additional bone densitometry machines would be approved by the province. The committee established reflected the interests, expertise and sectors required to address its mandate.

Drawing on the input and expertise of the committee members, the literature, practices in other jurisdictions and recent recommendations from the National Osteoporosis Foundation, the Osteoporosis Society of Canada, the Society of Obstetricians and Gynaecologists of Canada, the World Health Organization, Health Canada Guidelines, the Canadian Association of Radiologists and the Nova Scotia Report of the Expert Panel, the committee is pleased to offer the following twelve (12) recommendations:

It is recommended that:

Prevention

1. ***A coordinated, inter-sectoral program, be developed to educate children, parents and health care providers on the important factors in preventing osteoporosis during childhood and adolescence.***

   The most important factors in preventing osteoporosis are attaining peak bone mass during childhood and adolescence and maintaining bone mass thereafter. It is evident that optimizing diet and activity at this stage would have the most significant impact in preventing osteoporosis. **Crucial years for building healthy bones are in childhood and most particularly in teenage years, 10–14 in girls and 13–17 in boys** (21, 24, 25).

2. ***Community based initiatives to reduce the incidence of falls in the elderly population must be strengthened and endorsed.***

   The prevalence of injuries and fractures due to falls is proportionately highest among the elderly and persons with disabilities. Due to the complex personal and environmental factors known to contribute to falls, finding ways to reduce their occurrence is a major challenge. Any one group or sector cannot solve the problem. It is our belief that community based initiatives, through partnerships with other sectors and agencies, will assist in reducing the incidence of falls in Nova Scotia's rapidly aging population.

3. ***The long term care sector establish a preventative and outcome measurement program that assesses and implements supplementation of resident's nutrition with calcium and Vitamin D. In addition, and in collaboration with the District Health Authorities, a fall assessment program that includes the appropriate use of hip protectors be considered to reduce the risk of fractures.***

   It is estimated that 10% of falls resulting in fractures occur in institutions. It is evident that the risk of fracture in this population can be significantly reduced with the use of Vitamin D and calcium, the identification of residents most at risk for falls and the appropriate use of hip protectors.

4. ***A standardized risk and fall assessment protocol should be incorporated into the home care assessment process and the discharge process in acute care.***

Falls are both predictable and preventable. Personal risk factors associated with falls, particularly among the older population, appear to operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual. Health care providers in home and in acute care settings have unique opportunities to identify and implement appropriate interventions with individuals at risk for falls.

Standards and Guidelines for Diagnosis and Treatment

5. ***The criteria for bone density testing be accepted and implemented as provincial guidelines.***

Bone mineral densitometry should be performed when the decision to treat is based on how the test will change the patient's management, such as altering counselling regarding activity or changing the therapy. Based on a cost-benefit analysis, bone densitometry is not currently recommended as a routine screening tool. The most effective technology for diagnosis of osteoporosis is bone mineral densitometry.

6. ***The Provincial Formulary Management Committee approves the recommended revisions to the medications used for the treatment of Osteoporosis covered by the Nova Scotia Seniors' Pharmacare Program.***

Based on the best evidence and clinical opinion we believe that minor changes are needed to the current medications covered by Pharmacare to optimize the care of patients/clients with osteoporosis.

7. ***District Health Authorities should incorporate primary prevention services into care planning. Nutritional and medication counselling, activity programs, and follow up support are important to include in a primary prevention regime.***

Effective treatment requires compliance with lifestyle changes and adherence to the medication regime. The evidence is clear that compliance to osteoporosis drugs is low. Patients who are well educated about osteoporosis medications have a higher compliance rate. Educational and support programs, such as those provided within the Capital Health District (Dartmouth General & the QEII) are examples of how education and follow-up services could be provided. Partnerships with community based groups and agencies to support activity programs and community awareness are necessary.

Quality Standards, Performance Monitoring and Reporting

8. The guidelines and recommendations outlined for the standardization and quality monitoring of the bone densitometry units are implemented.

The value of bone densitometry is not only in the initial diagnosis of risk, but also as a tool to monitor the effectiveness of treatment. To achieve comparability of patient results over time and between machines, the continuation of a single vendor in the province should be maintained in the replacement and acquisition of new units. The validity and reliability of the results will be further enhanced through a standardized quality monitoring approach that assesses each unit, each unit as compared to others in the province, the technologist performing the exam and the physician interpreting the results. The implementation of the Bone Densitometry Accreditation Program of the Canadian Association of Radiologists (Appendix G) to all bone densitometry services, provided in the Districts, will also facilitate a consistent standardized approach.

9. The development and use of indicators, both for clinical and non-clinical activities related to the management of osteoporosis, must be emphasized to be of maximum benefit. To better facilitate development of indicators, it is further recommended that a process be put in place to validate the core set of indicators to be collected.

The Department of Health currently collects data on the type, place of fall and number of fractures occurring on an annual basis in each District Health Authority. We believe additional indicators that monitor the adherence of the guidelines developed for bone density testing and the standardization of the units is necessary. This will evaluate the benefits outlined for the management of osteoporosis and ultimately the reduction of fractures in the province.

Resources/Access

10. The next two (2) bone density units to be purchased and supported by the Department of Health should be placed in Industrial Cape Breton and the other in the Southwestern part of the province.

A review of other jurisdictions noted significant variation in identifying the appropriate number of bone density units for a specified population. While there was considerable discussion on the appropriate number of bone density units for Nova Scotia, determining the adequate number of units was beyond the scope of our committee. First, our review of the available data, and utilization of the current units identified significant access issues for residents of Cape Breton and the Southwest area of Nova Scotia. We believe this access issue should be addressed in the placement of the next two units. Second, we noted the underutilization of the unit in Truro, operating on a half-day basis, and believe that existing units should be maximally operated.

A centralized booking system for bone density testing, with the implementation of the Meditech system and the interface with McKesson's at the QEII, should also be explored to facilitate the appropriate utilization of the units.

Education and Communication

11. An educational and communication plan for the management of osteoporosis be developed and implemented to educate the public and support clinical care.

To successfully implement the recommendations and achieve a coordinated approach to the management of osteoporosis, a planned educational approach will be required with health care providers in the District Health Authorities and long term care facilities. We also believe a communication plan that includes the Osteoporosis Society of Canada, Nova Scotia Chapter, will be essential in clarifying expectations and responsibilities of patients/clients.

Leadership

12. The roles and responsibilities of the Department of Health and the District Health Authorities should be identified in implementing the recommendations outlined.

The provincial approach to the management of osteoporosis, outlined in the recommendations, will require a coordinating role from the Department of Health. We envision this role to oversee the implementation of the recommendations and the development of a process to review and evaluate the impact within two years. Operationalizing the recommendations, including the monitoring and reporting of indicators on an annual basis, will be a collaborative effort between the Department of Health and the District Health Authorities.

The recommendations outlined are presented as the first step in the process of addressing the issues associated with the prevention, diagnosis and treatment of osteoporosis.

The implementation process, with ongoing evaluation, will be essential to ensure the overall outcome — the reduction of fractures and associated effects on both the individual and family who are at risk or have osteoporosis in Nova Scotia.

Mandate of the Provincial Osteoporosis Committee

The Provincial Osteoporosis Committee (POC) was established in June 2001, to develop a provincial approach that would coordinate and integrate care and health services provided to the population at risk or who have osteoporosis. Central to the work of this committee was the recognition and acknowledgement of the work previously completed on osteoporosis. The report of the Expert Panel on the Diagnosis and Management of Osteoporosis (February, 1998) contained a number of recommendations on how patients at risk for osteoporosis should be assessed, diagnosed and treated in Nova Scotia. Though incomplete, the Bone Densitometry Committee's (1999) work also served as the foundation for the work of the POC. The committee membership (Appendix A) reflected the interests, expertise and sectors required in addressing the following objectives:

- To develop provincial standards, outcomes and performance indicators for the prevention, diagnosis and treatment of Nova Scotia residents at risk for or who are experiencing osteoporosis.
- To establish mechanisms to monitor, document and report on selected performance indicators.
- To outline implementation strategies for the standards/guidelines, monitoring, reporting, roles and responsibilities of the stakeholders in the process.
- To develop strategies and timelines to assess and/or revise the care and health services delivered to this population.

Adopting the principles and goals identified and elaborated on by the Expert Panel on the Diagnosis and Management of Osteoporosis (February, 1998) and the current strategic directions of the Department of Health, the POC viewed its mandate as developing recommendations that would result in an overall reduction in the rate of insufficiency fractures in residents of Nova Scotia. The recommendations focus on prevention, improved detection, education and treatment of osteoporosis throughout the lifecycle.

The committee held its initial meeting in June 2001 and continued to meet until November 2001, for a total of five meetings. The resultant report has been developed through the input and contributions of the committee experts and consultation with those in the field. The committee also reviewed the literature, current projects in the Province, (Community Links of Nova Scotia) practices in other jurisdictions, the recommendations from the National Osteoporosis Foundation, the World Health Organization, the Osteoporosis Society of Canada, the Canadian Association of Radiologists and the Society of Obstetricians and Gynaecologists of Canada.

The Report's Approach

The report's approach to managing osteoporosis is in the context of the Department of Health's strategic directions and growing emphasis on a population health approach for Nova Scotia. The committee members deliberated on whether to centre the recommendations from a disease management or from a health promotion perspective. The focus on managing osteoporosis became the central thrust, although there is clearly an underlying emphasis on the development and maintenance of healthy bones throughout one's life. The overall objective of the committee was to provide a report that built on the excellent work previously completed for the Department of Health. As such, detailed information referred to in the report can be obtained from the Department.

The work and unique contributions of each Committee member is reflected in the report. Disease identification, incidence and relevant statistics will highlight the significance of the problem for Nova Scotia followed by the recommendations with supporting rationale. Each recommendation includes the estimated costs, based on available information, and implementation strategies. An overall implementation plan is proposed with suggested timelines.

Significance of the Problem

Osteoporosis is a major health and economic problem in Nova Scotia, in Canada and in other countries. It is estimated that 30% of women and 12.5% of men over the age of 50 have osteoporosis (1). The Canadian Multi Centre Osteoporosis Study estimated that 1,000,000 women and 400,000 men in Canada are affected by osteoporosis, for a total of 1.4 million Canadians (3). Applied to Nova Scotia, this means that 43,340 women and 15,424 men are estimated to have osteoporosis. The majority of them remain undiagnosed and possibly non-symptomatic (Appendix G).

Osteoporosis is a disease in which there is a generalized loss of bone mass and microarchitectural deterioration of bone tissue (4). There is a consequent reduction in bone strength and an increased susceptibility to spontaneous fractures or fractures in response to low energy trauma. The World Health Organization defines osteoporosis as a bone mineral density measurement (T Score) of more than 2.5 standard deviations below the mean for young adults (6, 7). Low bone mineral density is the single most important predictor of bone fragility and accounts for 80% of an individual's fracture risk. The relative risk of new fractures resulting from mild to moderate trauma is about 2.0 for every 1 standard deviation decrease in bone density below age-matched controls. In vertebral fractures, the relative risk rises to 2-2.4. Risk is further increased when associated with other factors such as previous fractures and family history (8). According to the US National Osteoporosis Foundation, an estimated 70% of all hip fractures are a result of osteoporosis (7).

In 1993, Goeree et. al., estimated that osteoporosis-related hip fractures accounted for 21,000 hospitalizations in Canada (5). Another study attributed 80% probability of osteoporosis contributing to fracture in white women aged 45-65 and rising to 95% in the over 85-age group (7, 9). The most significant clinical manifestation of osteoporosis is fracture resulting in further complications of pain, deformity, postural changes due to spinal fractures, disability, physical deconditioning due to inactivity, loss of independence and changes in self-image and death.

- Vertebral compression fractures occur more frequently in women than in men, and typically affect T8-L3*. Two thirds of these fractures, which may develop during routine activities such as bending, lifting, or rising from a chair or bed are asymptomatic and it is possible that half of these fractures may not come to clinical attention.

- Hip fractures tend to affect an older population and the sex distribution is more even than with vertebral fractures. Most patients fail to recover normal activity and mortality within one-year. This approaches 20% for women and 34% for men. It is important to note that 14% of patients who suffer hip fractures are in a nursing home within the first year of injury (8).

- Wrist fractures are also common leading to conditions such as premature arthritis and painful wrist motion (3).

In Canada, it is estimated that the diagnosis of osteoporosis utilizes 1.8 million inpatient days per year (10). As illustrated in Table l, inpatient separations in Nova Scotia for hip and spine/wrist fractures have clearly increased by 11% and 17% respectively. This increase has resulted in the use of 28,760 inpatient days in 2000. The financial impact of fractures, specifically related to hip fractures, has been studied in Canada and in 1993 it was estimated to be $1.3 billion per year ($465 million in acute hospitalization, $563 million for long term, $279 million in chronic care costs) (5). These direct care estimates exclude the costs to families or caregivers in caring for the family member at home. In Nova Scotia, the costs have not yet been accurately identified; however, the report of the Expert Panel estimated the annual acute care costs to be $8 million in 1996-97 (3). Several other studies, conducted in the United States, identified the range of acute care costs, specifically associated with hip fractures, to be between $19,500-21,900 per patient (8, 11, 12). These studies also concluded that 14% of patients who suffer hip fractures are transferred to a nursing home for care within the first year of injury. The average nursing home cost for one resident in Nova Scotia is approximately $46,355 a year. We do know that with Nova Scotia's aging population and the rising incidence of fractures, the cost associated with care in all settings (acute & chronic) will continue to increase. To reverse this trend strategies are required to reduce the incidence of osteoporosis, improve early identification and treatment, and decrease the occurrence of falls.

*However, a recent Canadian study (42) suggested the discrepancy between men and women was not as great as previously thought.

Table 1: Inpatient Separations and Total Patient Days

Diagnosis	Total Separations						Total Patient Days					
	1995	1996	1997	1998	1999	2000	1995	1996	1997	1998	1999	2000
Hip Fracture	968	1049	1108	1035	1043	1167	18730	18918	25758	17643	25192	23110
Spinal Fracture	191	211	186	169	199	195	2349	2740	2545	2189	2427	3110
Wrist Fracture	445	389	420	383	427	435	2470	2674	2828	3704	2552	2540
Grand Total	1604	1649	1714	1587	1669	1797	23549	24332	31131	23536	30171	28760

Recommendations, Estimated Costs and Implementation Strategies

The following twelve recommendations with supporting rationale are submitted for consideration. In addition, implementation strategies and estimated costs are identified. An overall implementation plan that pulls all strategies together is presented in a separate section of the report. The recommendations are based on our review of the literature, consultation with experts outside the committee members, practices in other jurisdictions and the recommendations from the National Osteoporosis Foundation, the World Health Organization, the Osteoporosis Society of Canada, the Canadian Association of Radiologists and the Society of Obstetricians and Gynaecologists of Canada. The recommendations are presented under the broad headings of: prevention, guidelines for diagnosis and treatment, quality standards, performance monitoring and reporting, resources/ access, education and communication and leadership.

Prevention

1. ***Develop a coordinated, inter-sectoral program, to educate children, parents and health care providers on the important factors in preventing osteoporosis during childhood and adolescence.***

Rationale

The available evidence clearly indicates a role for healthy lifestyle practices in promoting healthy bones and decreasing the likelihood of fractures throughout the lifecycle. Calcium is a mineral that plays an essential role in the development and maintenance of a healthy skeleton. Vitamin D promotes active absorption of calcium across the intestinal wall and is thought to play a role in bone mineralization. The role of adequate calcium

and Vitamin D through diet and nutritional supplementation throughout life has been identified as a key factor in maintaining healthy bones (13-23). **Crucial years for building healthy bones are in childhood and most particularly in teenage years, 10–14 in girls and 13–17 in boys** (21, 24, 25). The bone mass accumulated during youth and the rate of bone loss occurring after age 35 determines the amount of bone present later in life. Both processes are thought to be equally important in determining bone mass at age 70. Factors most associated with achieving maximal peak bone mass are genetic heritage, physical activity and adequate diet (8).

In addition, emphasizing the importance of being smoke free during the teenage years has been identified as a general measure for health and in preventing osteoporosis and osteoporosis related fractures in the middle years of life.

Estimated Costs

There are no direct costs associated with the implementation of this recommendation.

Implementation Strategy

There are many agencies, associations, societies and departments whose mandate includes public education and primary health promotion in adopting healthy lifestyles. Emphasizing the importance of adequate calcium and Vitamin D, and physical activity during the teenage years could be emphasized through partnerships with the Osteoporosis Society of Canada, Nova Scotia Chapter, the Nova Scotia Heart and Stroke Association, the Department of Education and the Dairy Industry. The partnership with the Department of Education would provide many opportunities to promote activity and healthy eating habits, beginning with a review of the meals and snacks offered to students in Nova Scotia schools. It is assumed that the Public Health Branch of the Department of Health would take the lead role in this initiative.

2. Strengthen and enlarge community based initiatives to reduce the incidence of falls in the elderly population.

Rationale

Falls are a widespread problem that is extremely costly in terms of human suffering and economic impact. The prevalence of injuries due to falls is proportionately highest among the elderly and persons with disabilities. This problem is expected to be compounded in the decades ahead with the significant projected increase in the population over 65. About one in three elderly people experience a fall every year and approximately one quarter of these suffer moderate to severe injuries (26). One study reported that one in 12 people age 65 and over reported being injured by a fall in the previous year. Risk factors include personal factors, interactions between people and

their environments and environmental factors (27). The personal factors are summarized in Table 2. Personal risk factors associated with falls, particularly among the older population, appear to operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual (8, 27). However, these factors are part of a bigger picture. Most falls happen in combination with the environment; singular strategies like exercise or reducing medication will not solve the problem. Due to the complex personal and environmental factors known to contribute to falls, finding ways to reduce their occurrence is a major challenge. The problem cannot be solved by any one group but requires a multifaceted and interdisciplinary approach.

Currently in Nova Scotia, Community Links, in partnership with the Nova Scotia/Nunavut Command of the Royal Canadian Legion and the Family Caregivers Association of Nova Scotia, has received federal funding for a province-wide project. The aim of the project is to create a broad-based intersectoral partnership that will develop and support sustainable population health and health promotion approaches to preventing falls among seniors, veterans and caregivers in Nova Scotia (Appendix B). We believe this project will be an effective approach in addressing this recommendation.

Table 2: Personal and Indoor Environmental Risk Factors Associated with Falling

- Female gender
- Previous falls
- Fear of Falling
- Functional Impairment
  - Poor Balance
  - Hypotension
  - Dizziness
- Sensory Impairment
  - Impaired vision/bifocals
  - Diminished proprioception — impaired hearing
- Musculoskeletal Status
  - Muscle weakness
  - Reduced bone density
  - Stiff gait
- Advanced Age
- Cognitive and Emotional Disorders
  - Dementia
  - Depression
  - Attention deficits
- Chronic illness
  - Hypothyroidism
- Cardiovascular changes
- Nocturia
- Strokes
- Arthritis/osteoporosis
- Effects of medications
- Excessive medications
- Drug interactions
- Behavioural Risks
  - Risk Taking
  - Hurrying
  - Inattention
- Lifestyle
  - Drugs
  - Alcohol
  - Sedentary Living
  - Choice of footwear
- Indoor environment
  - Stairs
  - Poor illumination
  - Slippery floors
  - Scattermats
  - Telephone cords
  - Furniture at improper heights

Estimated Costs

The Department of Health currently contributes to supporting the activities of Community Links. There are no further direct costs identified.

Implementation Strategy

The Department of Health continues to partner with Community Links the lead in a provincial project — to *Prevent Falling in Nova Scotia* (Appendix B). In addition to the objectives, the network and tool kit development, train the trainer program and a public awareness campaign, will be effective strategies in supporting community based initiatives to reduce the occurrence of falls in all Nova Scotia communities. We recommend a member of the provincial trauma program become a member of the project's steering committee and report regularly to the co-ordinator, Department of Health, monitoring the implementation of the outlined recommendations.

3. The long term care sector establishes a preventative and outcome measurement program that assesses and implement supplementation of resident's nutrition with calcium and Vitamin D. In addition, and in collaboration with the District Health Authorities, a fall assessment program that includes the appropriate use of hip protectors be considered to reduce the risk of fractures.

Rationale

The evidence is clear that all individuals over the age of 65 can benefit significantly from an adequate intake of calcium and Vitamin D. Appropriate intake has been shown to reduce the risk of non-vertebral fractures by 50% at three years (18). For those individuals who have minimum exposure to light, such as the housebound elderly or those in nursing homes, the evidence is sufficient to recommend 400–800 international units of Vitamin D as a public health measure (8). A study conducted in a nursing home setting, examining the effect of calcium and Vitamin D supplementation to elderly women, found a 43% reduction in hip fractures and a 32% reduction in non-vertebral fractures at 18 months (19).

A survey of the 74 licensed nursing homes and homes for the aged in Nova Scotia was conducted by the Continuing Care Branch in the Department of Health in November 2001 to assess the current status of prevention and treatment programs around osteoporosis (Appendix C). The results of the survey indicated that 10% of the 5224 residents were receiving a calcium supplement with only 4.8% receiving Vitamin D. One facility, North Queen's Nursing Home in Caledonia, has initiated a program of daily supplementation of calcium and Vitamin D to the pudding at lunch, and this is offered to all residents (Appendix D). The cost of this method of supplementation has been

identified as 10.5 cents per resident per day. As identified previously, hip fractures usually result from two interacting processes; a fall or other traumatic event resulting in direct impact to the hip and an underlying weakness in the bone caused by osteoporosis. Leading risk factors for falls include weakness, gait and balance disorders, functional, visual and/or cognitive impairment and the side effects of drugs, together with environmental hazards such as icy pavements and/or objects on the floor. Multifactoral assessments of risk, combined with targeted interventions such as exercise programs, inspection and control of hazards in the living environment, can significantly reduce the incidence of falls by 10-30%. A falls assessment program that includes identified outcome measures will need to be more fully developed in the province to address all factors influencing the risk of falls.

More recently, the use of hip protectors** (padded undergarment to protect hips) has been identified as a possible strategy in reducing the risk of fracture in persons at increased risk (those with osteoporosis and a high risk of falling, such as those with impaired gait or balance and weakness) and particularly for those residing in health care institutions because they are likely to be frail (28, 29). The research currently being conducted at the Veterans unit at the QEII, which is examining the use of hip protectors, will be useful in establishing the appropriate use in long term care facilities in Nova Scotia.

Estimated Costs

The cost associated with nutritional supplementation for all nursing home residents in Nova Scotia is estimated to be $200,000 annually. This cost should be accommodated within existing budgets. Currently, the purchase of hip protectors ($150–200) for individual residents require special approval from the Department of Health.

Implementation Strategy

A number of activities will be required to implement all aspects of this recommendation. These include policy development around supplementation, appropriate exercise programs in long term care facilities, the development of a falls assessment program with outcome measures that are monitored and reported, the appropriate use of hip protectors and a process to educate the long term care staff. The experience and findings of the QEII's work in the use of hip protectors should be incorporated into the approach.

We believe that a member within the Continuing Care Branch, Department of Health, will need to be assigned a lead role in working with long term care facilities and the District Health Authorities to ensure consistency and appropriate use of limited resources in operationalizing this recommendation.

** Only two (2) types of hip protectors have been found to be effective at reducing hip fractures (28, 29).

4. Incorporate a standardized risk and fall assessment program with outcome measures into the home care assessment process and the discharge process in acute care.

Rationale

Falls are predictable and preventable. Personal risk factors associated with falls, particularly among the elderly population appear to operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual. Health care providers in home and in acute care have unique opportunities to identify and implement appropriate interventions with individuals at risk for falls. The implementation of the automated assessment process for Single Entry in the province (Minimum Data Set-Home care) provides an excellent quide for assessment of clients at risk for falls. An extensive educational program is planned for care coordinators in the District Health Authorities. Ongoing assessment of clients in long term care facilities, home care and on discharge from acute care will also require education and training.

Estimated Costs

The cost associated with the educational program on the use of the automated assessment tool for Single Entry is included in the budget. Additional time may be required to educate long term and acute care staff on the assessment tool.

Implementation Strategy

The fall assessment guidelines outlined in the Minimum Data Set–Home Care (MDS–HC) have been developed by experts in the area of fall prevention and could serve as the basis for the development of a fall prevention program in all practice settings. The educational program planned for single entry could be adapted to the acute and long-term care setting. To maximize the use of resources, it is further suggested that a coordinated approach, (LTC, home care and the discharge planners in acute care) be used to formalize this process. The Continuing Care Branch at the Department of Health, specifically the educational coordinator for the MDS-HC guidelines, could potentially take the lead with this initiative.

Standards and Guidelines for Diagnosis and Treatment

5. Accept and implement the criteria for bone density testing as provincial guidelines.

Rationale

Bone mineral densitometry should be performed when the decision to treat is based on how the test will change the patient's management, such as altering counselling regarding activity or changing the therapy. Based on a cost-benefit analysis, bone densitometry is not currently recommended as a routine screening tool. The most effective technology for diagnosis of osteoporosis is bone mineral densitometry (3). The process for the development of the guidelines for bone density testing considered the available evidence, the input and contributions of the committee experts and consultation with those in the field, the literature, practices in other jurisdictions, the recommendations from the National Osteoporosis Foundation, the World Health Organization, the Osteoporosis Society of Canada and the Society of Obstetricians and Gynaecologists of Canada. The guidelines developed were also sent to two clinical experts outside the POC for comments.

While there is no clear consensus on the criteria for bone density in men, the POC considered current evidence in providing direction for the use of testing in men within the guidelines. Though not routinely identified, children may also require the use of bone density testing in the management of symptomatic osteoporosis in rare metabolic bone disorders and those therapies/diseases known to affect the bone density of children and adolescents. The guidelines clearly recommend that Bone Mineral Density testing in children should only be ordered on the recommendation of a paediatrician or other specialist with a special interest in metabolic bone diseases. In paediatric cases, the Z score is crucial for interpretation. Results of bone density testing in children should report the Z score.

The recommended target population for assessment using bone mineral densitometry is outlined in Appendix E.

Estimated Costs

Estimates for the printing, circulation and educational costs associated with the developed guidelines are $2,700–$5,000.

Implementation Strategy

Studies have indicated that family practitioners play a key role in the appropriate use of bone density testing (30). We believe that in addition to physician specialists, every family practitioner should receive a copy of the guidelines (Appendix E) in conjunction with an educational component to be provided in each District Health Authority. Initiating a partnership with the Medical Society will also provide a method of communicating the findings and recommendations associated with this report to all physicians in the province, (provide the necessary background and supporting rationale to the guidelines). We believe the education should be provided by the physicians who were members of the POC.

6. The Provincial Formulary Management Committee approve the recommended revisions to the medications used for the treatment of Osteoporosis covered by the Nova Scotia Seniors' Pharmacare Program.

Rationale

Fundamental to any recommendation regarding prevention of osteoporosis, is the understanding that lifestyle changes to promote preservation of bone density will be followed. These include maintaining an adequate intake of calcium and Vitamin D, maintaining appropriate body weight, not smoking, undertaking regular physical activity and limiting intake of alcohol and caffeine. These important lifestyle choices are used in conjunction with, but cannot replace, the antiresorptive drugs used to treat osteoporosis where appropriate.

Antiresorptive agents used in the prevention and treatment of osteoporosis include hormone replacement therapy, bisphosphonates, (alendronate, etidronate and risedronate) selective estrogen receptor modulators (raloxifene) and calcitonin. Each of these agents has value in the management of osteoporosis, but the benefits have often only been proven in certain settings.

In the setting of already established postmenopausal osteoporosis (PMO) the second generation bisphosphonates (alendronate and risedronate) have been proven effective in decreasing vertebral, hip and other non-vertebral fractures (31, 32, 33, 34). Raloxifene (35) and, to a lesser degree, etidronate, (36) have been proven to decrease vertebral fractures in established PMO. The quality of the data in this setting for the efficacy of estrogen and calcitonin is debatable and consequently, they are considered second-line agents in the treatment of established osteoporosis.

In the setting of glucocorticoid-induced osteoporosis (GIOP) the second generation bisphosphonates, (alendronate and risedronate) have been proven to decrease the risk of vertebral compression fractures (37, 38, 39). Two other options have been studied in

this setting, etidronate with inconsistent results on its efficacy to decrease the incidence of new vertebral fractures and calcitonin, with benefits on vertebral bone density, but which failed to show any decrease in the risk of vertebral fractures. Estrogen and raloxifene have not been studied in GIOP.

In male osteoporosis, there is a paucity of studies. However, alendronate has proven benefits in decreasing vertebral fractures in men with osteoporosis (40). There was a small study that showed benefits on bone density in men with osteoporosis treated with etidronate but the study was not powered to show benefits on incidence of fractures. Although there is no specific data in the use of either risedronate or calcitonin in male osteoporosis, it is believed that these have much the same benefit in this setting as those in the established postmenopausal osteoporosis.

Acute osteoporotic vertebral fractures are often asymptomatic; however, they can cause unbearable pain. This can lead to the patient becoming bedridden and often results in hospitalization. Pain may last for up to 3 months. There are well-documented analgesic benefits of calcitonin in the setting of painful vertebral fractures (41). Calcitonin also has the advantage of having very few side effects. This can make calcitonin very useful especially compared to the side effects of other commonly used analgesic agents used in this setting. As an example, narcotics are effective agents to control the pain of an acute vertebral fracture; however, it often makes people drowsy which can lead to increased falls. This is a disastrous combination in the setting of established osteoporosis. COX-2 specific inhibitor (COXIBs) and Non-Steroidal Anti-inflammatory Drugs (NSAIDs) are also used for pain control, but they may cause hypertension and renal complications in the elderly, which is the group most at risk for osteoporosis.

In summary, the appropriate choice of therapy for osteoporosis is highly dependent on the efficacy of the agent in the appropriate setting. Other important factors to be considered on an individual basis are patient characteristics pertaining to contra-indications to certain agents and patient preference.

Currently, the Nova Scotia Seniors' Pharmacare Program has reasonable coverage for antiresorptive agents in the setting of confirmed and established osteoporosis. However, modifications to the criteria for these agents to allow their use in the prevention of steroid-induced osteoporosis are recommended and are outlined in Appendix F. We are also recommending that the duration of calcitonin coverage in painful bone fractures from osteoporosis and in other settings be extended from 6 weeks to 3 months.

Estimated Costs

In patients younger than 65 with osteoporosis, institution of an appropriate agent will occur prior to the period of usual benefit coverage by the Pharmacare Program. Drug costs will be covered by the individual or by their private insurance program.

In certain instances, the course of treatment will be completed before the patient reaches 65 years of age and it can be argued that this will result in cost savings for both the Nova Scotia Pharmacare Program and to the Department of Health (as a result of decreased hospitalization for osteoporotic fractures).

It is anticipated these recommended changes to the Nova Scotia Pharmacare Program criteria (Appendix F) will result in an increase in costs. A review of the cost trends, illustrated in Table 3, of the antiresorptive agents over the last several years suggests that an increase of 15-20% is a reasonable estimate. The $215,600–$287,600 increase in 2002–2003 is expected to be covered within the operational funds of the Nova Scotia Pharmacare Program. It is important to note that better management of patients with osteoporosis will lead to some savings to other budgets within Department of Health as a result of decreased admissions to hospitals and long term care facilities.

Table 3: Pharmacare Costs for Osteoporosis

	Year				
Individuals Treated	**1998/1999**	**1999/2000**	**2000/2001**	**2001/YTD**	**2001/2002 Projected**
	415	1,167	1,421	1,941	2,329
***Drug Costs**	665,862	1,004,027	1,232,884	1,363,035	1,415,178

Source: Nova Scotia Pharmacare Program

**Drug Costs includes dispensing fees*

Implementation Strategy

We will be forwarding a letter to the Formulary Management Committee at the Department of Health requesting that the criteria for coverage under the Pharmacare Program be revised based on the current clinical evidence and recommendations from the expert clinicians. If approved, a communication plan informing all physicians will need to be initiated with the Pharmacare Section of the Department of Health taking the lead on this initiative. The approved guidelines could become part of a continuing medical education initiative through the Drug Evaluation Alliance of Nova Scotia.

7. District Health Authorities should incorporate primary and secondary prevention services into care planning. Nutritional and medication counselling, activity programs, and follow up support are important to include in a primary prevention regime.

Rationale

Effective treatment requires compliance with lifestyle changes and adherence to the medication regime. The evidence is clear that compliance to osteoporosis drugs is low. Patients who are well educated about osteoporosis medications have a higher compliance rate. Educational and support programs, such as those provided within the Capital Health District (Dartmouth General & the QEII) are examples of how education and follow up services could be provided. Other partnerships that can be developed to support primary and secondary services to patient/families and to improve awareness include the Osteoporosis Society of Canada, Nova Scotia Chapter, and other community agencies.

Estimated Costs

There are many ways to implement this recommendation. The QEII has a regular part-time nurse position that provides ongoing support and education to clients diagnosed with osteoporosis. Dartmouth General Hospital (DGH) Osteoporosis Program provides monthly education session to patients with a confirmed diagnosis of osteoporosis or osteopenia. It is already available to all districts via telehealth. The cost to the Capital Health Authority is minimal since Dartmouth General Hospital Osteoporosis Program is funded through community fund raising efforts.

Implementation Strategy

Each District Health Authority should explore potential partnerships with other DHAs and/or community agencies, to develop the services necessary to provide ongoing education and support to patients/families and to increase awareness in the community.

Quality Standards, Performance Monitoring and Reporting

8. Implement the guidelines and recommendations outlined for the standardization and quality monitoring of the bone densitometry units.

8. a) Equipment Standardization

Recommendation

At the time of purchase of subsequent DEXA units by the province of Nova Scotia, provided the units are relatively equal in their abilities and contract prices, acquisition of units similar to those presently in clinical use should be strongly encouraged so comparable data is produced.

Rationale

The value of bone densitometry is great in the initial diagnosis and in monitoring the effectiveness of treatments. To be effective in this monitoring, the Dual Energy X-Ray Absorptiometry (DEXA) service needs to be assured that the values produced are consistent over time. Each vendor now provides this required consistency and stability. Therefore, based upon these criteria alone, there would be no need to standardize equipment.

There is another significant factor to consider. Results from one vendor's unit are not directly comparable to units from other vendors. There is a difference in both the absolute numeric value generated and more importantly the databases used for comparison (especially in the spine). There are potential differences in the T and Z scores. This limits the comparative data analysis if patients move between machines for follow-up exams. As well, it makes population based assessments difficult.

In addition, the ability to do bone testing in children will require the units to provide Z scores. This can be achieved with the purchase of pediatric software.

Estimated Costs

No additional direct costs are identified.

Implementation Strategy

The purchase of new DEXA's will need to comply with existing units. The Department of Health, Acute Care Branch, would be the appropriate coordinator of the process.

8. b) Quality Control/Quality Assurance

Recommendations

The Bone Densitometry Accreditation Program of the Canadian Association of Radiologists should accredit all bone densitometry service in Nova Scotia (Appendix G).

The medical physicist should use the same phantom as each unit is inspected annually. This data can be used for comparison of each unit in the province.

An ongoing quality assurance program should be established to assess all DEXA units in the province.

Rationale

DEXA requires a strong quality control program to ensure validity and reliable results. This is especially true since patients may be examined on more than one unit in the province. Quality control and quality assurance must assess all components of the process.

The Canadian Association of Radiologists have developed an Accreditation Program for Bone Densitometry. This program meets most of the province's needs for quality assurance. This accreditation program has components, which will help address, the work quality of the technologist and interpreting physicians. It also requires annual inspection by a medical physicist which will be helpful in inter-unit comparisons.

Each Unit

The manufacturer provides phantoms and a list of daily quality control test procedures. Strict adherence to these will monitor the stability of the DEXA unit itself.

Unit Comparability

The manufacturer of the existing DEXA units in Nova Scotia guarantees a certain level of comparability between all manufactured units. To monitor the performance between units, a single Lucite phantom could be used on a semi annual basis and after major equipment repair. This phantom would be scanned with each unit and the values compared to the values obtained on the other units.

Medical Radiation Technologist

The single largest determinant of the accuracy and precision of DEXA results is the technologist. The ability to standardize results will be increased by limiting the number of technologists performing the exams, ensuring a certain level of knowledge and putting in place certain methods of monitoring performances. Technologists performing bone densitometry should be certified by the International Society of Clinical Densitometry (ISCD) or a Canadian alternative accepted by the Accreditation Program for Bone Densitometry of the Canadian Association of Radiologists.

Physician

Standards must ensure that there is a consistent high quality approach to the interpretation of the results. The interpreting physician must be able to relate the information from various sources including clinical history, x-rays, bone densitometry and provide the appropriate interpretation.

Estimated Costs

The allocation of staff and radiologist's time from the District Health Authorities will be required to develop a provincially, standardized approach. The Bone Densitometry Accreditation program costs are $400 per unit (Appendix B).

Implementation Strategy

All District Health Authorities with bone density units will need to be involved in the development of a province wide quality assurance program. We would suggest that a

member of our committee be assigned a lead role in coordinating a group from the District Health Authorities to develop the specific program.

8. c) Standards for Bone Density Reporting

Recommendation

Special training and competency in the functioning, indications, interpretations, limitations, artifacts and quality control of bone densitometry is the final aspect-defining competency. Training and certification in Nuclear Medicine confers such competency. For those trained in the other aspects of diagnostic imaging, further training and certification of competency is required. This is currently obtainable with training from the International Society of Clinical Densitometry (ISCD). Efforts to develop a Canadian base system are currently underway and as they develop may be substituted for the ISCD.

Rationale

Bone density reporting requires a medical practitioner trained in the basic medical sciences. It is essential that they have an understanding of basic physiologic processes of bone metabolism and how that may be changed in various pathologies and its impact on patient management.

The interpreting and overseeing physician must have a solid under-standing of diagnostic tests and how they fit into patient management. They must understand diagnostic radiation. This is in terms of its effects both positive and negative. Those trained and certified in the Royal College Specialties of Diagnostic Imaging and Nuclear Medicine possess such skills.

Estimated Costs

Currently, the radiologists have self-funded the education required. Support, from the DHAs, for additional training for radiologists may need to be considered.

Implementation Strategy

The District Health Authorities will need to discuss the appropriate strategies for continuing education with their radiologists.

8. d) Report Standardization

Recommendation

The machine pages with images and numerical analysis should be standardized. It is less important to standardize the "interpretive" part of the report as long as the necessary information is included. The professionals providing this interpretation should be encouraged to develop a template that could be used by all groups since "relative"

similarity could be easily achieved. This template should include components recommended by the Accreditation Program for Bone Densitometry recognized by the Canadian Association of Radiologists.

Bone densitometry should be included in the plans for the provincial Picture and Archiving Communication System (PACS) and central archive. DIACOM connectivity must be part of the tender.

Rationale

A review of the reports that can be produced by the bone densitometry (DEXA) units presently in use in Nova Scotia was completed. Also reviewed was the report issued by the radiologist containing the signature.

Although there were some differences in the layout and arrangement of the two pages of the "report" as produced by the units, the equipment supplier noted that this could be easily standardized. In reviewing samples of interpretive reports from the three sites (QEII, Fishermen's, Colchester Regional) a significant difference in the content of the reports was not demonstrated by those generated by the unit and verified by the radiologist, or those dictated directly. It should not be difficult to achieve some adjustments which would make the look of the reports somewhat similar.

As the province moves toward a central patient archive, it becomes very important to standardize the equipment and reports. Standardization will help bone densitometry to integrate into this single record.

Steps are already underway to create a central archive of computerized tomography (CT) imaging procedures using a Picture and Archiving Communication System (PACS). The province only has one vendor DEXA product in clinical use at this time and the process to develop links between the sites having bone densitometry and the central archive has already begun. By putting this data into a central archive, it would be more readily available for access by clinicians or for trend analysis and outcomes of the DEXA service.

Estimated Costs

Staff and physician time will be required to implement the outlined recommendations.

Implementation Strategy

All District Health Authorities with bone density units will need to develop consistent policies and procedures associated with the recommendations outlined. We believe that one to two members of our committee, including a radiologist, should take the lead on developing policies, procedures and the standardization of reports for all District Health Authorities.

9. The development and use of indicators, both for clinical and non-clinical activities related to the management of osteoporosis, must be emphasized to be of maximum benefit. To better facilitate development of indicators, it is further recommended that a process be put in place to validate the core set of indicators to be collected.

Rationale

The Department of Health currently collects data on the type, place of fall and number of fractures occurring on an annual basis in each District Health Authority. We believe additional indicators that monitor the adherence to the guidelines for bone density testing, and the standardization of the units, is necessary, to evaluate the benefits for managing osteoporosis and ultimately reducing fractures in the province. In addition to monitoring bone density testing for compliance to the guidelines, Table 4 identifies other performance indicators that would be beneficial to monitor and report to DHAs/DoH on an annual basis.

Table 4: Performance Indicators

Benchmark	Quality Dimension
Wait times for testing	Patients on wait list/average number of patients seen per week
Positive test results	Number of positive osteoporosis diagnosis/number of tests done
Compliance to treatment	Number of compliant patients/number of return checks
Outcome from treatment	Number of improved results/number of compliant patients

Estimated Costs

There is a computer software program that can be implemented with the bone density units to track indicators. Staff time will be required to implement this recommendation.

Implementation Strategy

All District Health Authorities with bone density units will be required to standardize the data collected. We would suggest that a member of our committee be assigned the lead in coordinating a group from the five District Health Authorities. The group would include representatives from the diagnostic departments, the Department of Health, and the Performance Measurement and Health Informatics Branch, to validate the core set of indicators to be developed. Additional strategies and timelines will need to be further developed to monitor and report the validated indicators.

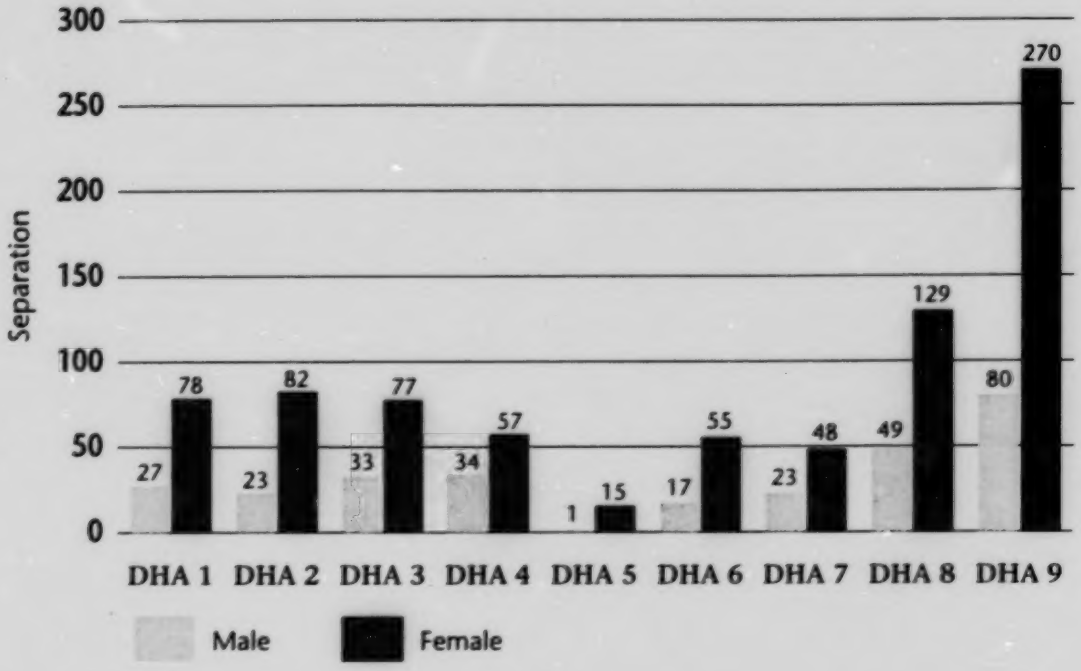
Resources/Access

10. The next two (2) bone density units purchased and supported by the Department of Health should be placed in industrial Cape Breton and the other in the Southwestern part of the province.

Rationale

A review of other jurisdictions identified significant variation in identifying the appropriate number of bone density units for a specified population. While there was considerable discussion on the adequacy of the number of bone density units for Nova Scotia, determining the appropriate number of units was beyond the scope of our committee. First, our review of the available hip fractures data (Table 5, Appendix H, I) and utilization of the current units identified significant access issues for residents of Cape Breton and the Southwest area of Nova Scotia. We believe this access issue should be addressed in the placement of the next two units. It is anticipated that the additional bone density testing capacity will impact positively on current wait times. However, if wait lists become too long, a process that addresses the need for urgent bone density will need to be put in place within the District Health Authorities. Second, we noted that the unit in Truro operates on a half-day basis only, and we believe that existing units should be maximally operated. A centralized booking system for bone density testing, with the implementation of the Meditech system and the interface with McKesson's at the QEII, should also be explored to facilitate the appropriate utilization of the units.

Table 5 Total Separations — Hip Fractures by DHA of Residence Fiscal 2000–01 (exclude transport accidents)



2001/11/06 Performance Measurement & Health Informatics

Estimated Costs

Capital Expenses

2 Bone Density Units — $94,000 x 2 = $188,000.00

Operating Expenses

Salaries: 2.5 FTE's (includes .5 for Truro)	$200,672.00
*Expenses	7,000.00
Education	3,000.00
MSI Fees	250,000.00
Total:	**$648,672.00**

*Estimates of expenses excludes maintenance contract and tube replacements after year one ($10,000–$12,000).

Implementation Strategy

Following Department of Health approval for the purchase of the units, Cape Breton and Southwestern District Health Authorities should consider collaborating on the purchase of the two (2) additional units. It is understood that all the districts with bone density units, including those currently in operation, will comply with the guidelines outlined in this report.

Education and Communication

11. Develop and implement an educational and communication plan for the management of osteoporosis to educate the public and support clinical care.

Rationale

To successfully implement the recommendations and achieve a coordinated approach to the management of osteoporosis, a planned educational approach will be required with health care providers in the District Health Authorities and long term care facilities. We also believe a communication plan that includes the Osteoporosis Society of Canada, Nova Scotia Chapter, will be essential in clarifying expectations and responsibilities of patients/clients in Nova Scotia.

Estimated Costs

Staff time from the Department of Health and District Health Authorities will be required to develop the communication plan.

Implementation Strategy

Communication staff in the District Health Authorities and the Department of Health will need to work collaboratively to develop a communication plan around the report and the strategies to implement the recommendations. In addition, collaboration with the Osteoporosis Society of Canada, Nova Scotia Chapter, will be helpful in disseminating the recommendations outlined in the report.

Leadership

12. Identify the roles and responsibilities of the Department of Health and the District Health Authorities in implementing the recommendations outlined.

Rationale

The provincial approach to the management of osteoporosis, outlined in the recommendations, will require a coordinating role from the Department of Health. We envision this role to oversee the implementation of the recommendations and the development of a process to review and evaluate the impact within two years. Operationalizing the recommendations, including the monitoring and reporting of indicators on an annual basis, will be a collaborative effort between the Department of Health and the District Health Authorities.

Estimated Costs

Staff time from the Department of Health and the District Health Authorities will be required.

Implementation Strategy

The Department of Health will need to designate responsibility to a branch. In addition, the District Health Authorities will need to identify the lead person responsible for the monitoring and reporting of indicators. A meeting to establish required actions and timelines will facilitate the overall management of the implementation process and expected outcomes.

Action Plan

Listed below are the actions required to support the recommendations. Each action outlines the accountabilities and associated timelines.

1. Approval of Committee Report
   Accountability: Department of Health
   Implementation Timeline: June 2002

2. Communication Plan developed to announce the Department of Health's Response
   Accountability:
   - Communication staff at the Department of Health
   - Communication staff at Cape Breton DHA
   - Communication staff at Southwest Nova DHA

   Implementation Timeline: June 2002

3. Person and/or division within the Department of Health identified as Implementation Coordinator
   Accountability: Department of Health
   Implementation Timeline: June 2002

4. Implementation team with lead people and strategies identified
   Accountability:
   - Department of Health
   - South Shore DHA
   - South West Nova DHA
   - Colchester East Hants DHA
   - Cape Breton DHA
   - Capital Health DHA

   Implementation Timeline: June 2002

5. First implementation team meeting
   Accountability:
   - Department of Health
   - District Health Authorities

   Implementation Timeline: June 2002

Summary

Osteoporosis is a public health concern that will become increasingly important as our population ages. It is a chronic, progressive metabolic bone disease that can affect almost the entire skeleton. Low bone mass by itself causes no symptoms. Osteoporosis is preventable and treatable but, because there are no warning signs until a fracture occurs, few people are diagnosed in time for effective therapy to be administered during the early phase.

The economic burden attributable to osteoporotic fractures is also significant. In Nova Scotia, the incidence of fractures will continue to rise as our population ages. Even the occurrence of a fracture may not elicit interventions to reduce the likelihood of subsequent fractures. Consequently, large numbers of individuals experience the pain, expense, disability and decreased quality of life caused by osteoporosis. To reduce the enormous costs associated with osteoporotic fractures, both fiscal and human, a number of strategies will need to be implemented and are outlined in the twelve recommendations developed by the Provincial Osteoporosis Committee. These are presented as the **first step** in the process of addressing the many issues associated with the prevention, diagnosis and treatment of osteoporosis in the province of Nova Scotia. The implementation process with ongoing evaluation will be essential to ensure the overall outcome — the reduction of fractures and associated effects on the individual and family who are at risk or have osteoporosis in Nova Scotia.

References

1. Melton, L.J. lll, How many women have osteoporosis now? *J Bone Miner Res, 1995; 10:175–177.*

2. Sernbo, I., Johnell, O. Consequences of a hip fracture: a prospective study over 1 year, *Osteoporosis International, 1993; 3:148–153.*

3. Bone Densitometry in the Province of Nova Scotia. *Report of the Expert Panel on the Diagnosis and Management of Osteoporosis. Halifax, NS. June 1998.*

4. NIH Consensus Development Conference: Diagnosis, proplylaxis and treatment of osteoporosis. *American Journal of Medicine, 1993, 94;646–650*

5. Goeree, R., O'Brien, B., D., Cuddy, L., Ferraz, M., Adachi, J., An assessment of the burden of illness due to osteoporosis in Canada, *J Soc Obset Gynaecol Can, 1996; 18(July suppl); 15–24.*

6. Scientific Advisory Board, Osteoporosis Society of Canada, Clinical practice guidelines for the diagnosis and management of osteoporosis, *Can Med Assoc J, 1996; 155:1113–1133.*

7. Melton, L.J.lll, Thamer, M., Ray, N.F., Chan, J.K., Chestnut, C.H.lll, Einhorn, T.A., et al., Fractures attributable to osteoporosis: report from the National Osteoporosis Foundation, *J Bone Miner Res, 1997;12(l).*

8. National Osteoporosis Foundation, Osteoporosis: review of the evidence for prevention, diagnosis and treatment and cost-effective analysis, *Osteoporosis International, 1998;(Suppl) 4:S3-S6:1–80.*

9. Elliott, D., Osteoporosis, Hip fractures and bone mineral density testing — Is mass screening a solution or a problem? *(1998) Unpublished paper.*

10. Papadimitropouloulos, E.A., Coyte, P.C., Josse, R.G., Greenwood, C.E. Current and projected rates of hip fracture in Canada, *Can Med Assoc J, 1997;157(10):1357–1363.*

11. US Congress Office of Technology Assessment Hip fracture outcomes in people age 50 and over- Background paper. *OTA-BP-H-120 Washington DC; US Government Printing Office, July, 1994.*

12. Brainsky, A., Fox, K.M., Epsteim, R., et al., The economic cost of hip fractures in the elderly. Presented at the 41st Annual Meeting, *Orthopaedic Research Society, Orlando, Fla., February 13–15, 1995.*

13. Panel members. NIH Consensus Conference: Optimal calcium intake. *JAMA, 1994; 272:1942–1948.*

14. Johnston, CC., Miller, JZ., Slemenda, CW., Reister, TK., Hui, S., Christian, J.C., Peacock, M. Calcium-enriched foods and bone mass growth in prepubertal girls-a randomized, double-blind, placebo-controlled trial. *J Clin Invest. 1997;99: 1287–1294.*

15. Chan, G.M., Hoffman, K., McMurry, M. Effects of dairy products on bone and body composition in pubertal girls. *J Pediatr 1995; 126;551–556.*

16. Cadogan, J., Eastell, R., Jones, N., Barker, M.E. Milk intake and bone mineral acquisition in adolescent girls: randomized, controlled intervention study. *BMJ 1997; 315: 1255–1260.*

17. Reid, I.R., Ames, R.W., Evans, M.C., Gamble, G.D., Sharpe, S.J. Effect of calcium supplementation on bone loss in postmenopausal women. *N Engl J Med 19993; 328: 460–464.*

18. Dawson-Hughes, B., Harris, S.S., Krall, E.A., Dallal, G.E. Effect of calcium and Vitamin D supplementation on bone density in men and women 65 years or older. *N Engl J Med 1997; 337: 670–676.*

19. Chapuy, M.C., Arlot, M.E., Duboeuf, F., Brun, j., Crouzet, B., Arnaud, S., Delmas, P.D., Meunier, P.J. Vitamin D3 and calcium to prevent hip fractures in elderly women. *N Engl J Med 1992; 327: 1637–1642.*

20. Recker, R.R., Hinders, S., Davies, K.M., Heaney, R.P., Stegman, M.R., Lappe, J.M., et al., Correcting calcium nutritional deficiency prevents spine fractures in elderly women. *N Engl J Med 1996; 11:1961–1966.*

21. Cumming, R.G., Nevitt, M.C. Calcium for the prevention of osteoporotic fractures in postmenopausal women. *J Bone Miner Res 1997; 12:1321–1329.*

22. LeBoff, M.S., Kohlmeier, L., Hurwitz, S., Franklin, F., Wright, J., Glowacki, J. Occult Vitamin D deficiency in postmenopausal US women with acute hip fracture. *JAMA 1999; 281: 1505–1411.*

23. Theintz, G., Buchs, B., Rizzoli, R., Slosman, D., Clavien, H., Sizonenko, P.C., Bonjour, J.P. Longitudinal monitoring of bone mass accumulation in healthy adolescents: evidence for a marked reduction after 16 years of age at the levels of lumbar spine and femoral neck in female subjects. *J Clin Endocrinol Metab 1992; 75; 1060–1065.*

24. Faulkner, R.A., Bailey, D.A., Drinkwater, D.T., McKay, H.A., Arnold, C., Wilkinson, A.A. Bone densitometry in Canadian children 8–17 years of age. *Calcif Tissue Int 1996; 59: 344–351.*

25. Faulkner, R.A., Bailey, D.A., Drinkwater, D.T., Wilkinson, A.A., Houston,H.A. Regional and total body bone mineral content, bone mineral density, and total body tissue composition in children 8-16 years of age. *Calcif Tissue Int 1993; 53;7–12.*

26. Gallagher, E., Scott, V. Taking Steps: Modifying pedestrian environments to reduce the risk of missteps and falls. *Victoria, B.C.University of Victoria; 2000.*

27. Alexander, B.H., Rivara, F.P., & Wolf, M.E. The cost and frequency of hospitalization for fall-related injuries in older adults. *Amer J of Public Health, 1992. 82(7):1020–1023.*

28. Rubenstein, L. Hip protectors—A breakthrough in fracture prevention. *N Engl J Med 2000 343:1562–1563.*

29. Kannus, P., Parkkari, J., Niemi, S., Pasanen, M., Palvanen, M., Jarvinen, M.. Vuori, I. Prevention of hip fractures in elderly people with use of a hip protector. *N Engl J Med 2000: 343:1506–1513.*

30. Jaglal,S.B., Mclaac, W.J., Hawker,G.,Jaakkimainen,L., Cadarette,S.M., Chan,T.B. Patterns of use of the bone mineral density test in Ontario. *CMAJ 2000;163(9)1139–1143.*

31. Black, D.M., Cummings, S.R., Karpf, D.B., Cauley, J.A.,Thompson, D.E., Nevitt, M.C., et al. Randomized trial of effect of alendronate on risk of fracture in women with existing vertebral fractures. Fracture intervention Trial Research Group. *Lancet 1996;348:1535–1541.*

32. Harris, S.T., Watts, N.B., Genant, H.K., McKeever, C.D., Hangartner, T., et al. Effects of risedronate treatment on vertebral and nonvertebral fractures in women with postmenopausal osteoporosis: a randomized controlled trial. *JAMA 1999;282:1344–1352.*

33. Reginster, J.Y., Minne, H.W., Sorensen, O.H., Hooper, M., Roux, C., Brandi, M.L., et al. Randomized trial of the effects of risedronate on vertebral fractures in women with established postmenopausal osteoporosis. *Osteoporosis Int 2000;11:83–91.*

34. McClung, M.R., Geusens, P., Miller, P.D., Zippel, H., Bensen, W., Roux, C., et al. Effect of risedronate on the risk of hip fracture in elderly women. *N Engl J Med 2001;344:333–340.*

35. Ettinger, B., Black, D., Mitlak, B.H., Knickerbocker, R.K. Reduction of vertegral fracture risk in postmenopausal women with osteoporosis treated with raloxifene: results from a 3-year randomized clinical trial. *JAMA 1999;282:637–645.*

36. Harris, S.T., Watts, N.B., Geannt, H.K., Wasnich, R.D., Ross, P., et al. Four-year study of intermittent cyclic etidronate treatment of postmenopausal osteoporosis: three years of blinded therapy followed by one year of open therapy. *An J. Med 1993; 95: 557–67*

37. Saag, K.G., Emkey, R., Schnitzer, T.J., Brown, J.P., Hawkins, F., Gowmaere, S., et al. Alendronate for the prevention and treatment of glococorticoid-induced osteoporosis. Glucocorticoid-induced osteo-porosis intervention study group. *N Engl J Med 1998;339:292–299.*

38. Cohen, S., Levy, R., Keller, M., Sewell, K.L., Boiling, E. Risedronate therapy prevents corticosteroid-induced bone loss: a twelve-month, multicenter, randomized, double-blind, placebo-controlled, parallel-group study. *Arthritis Rheum 1999;42:2309–2318.*

39. Reid, D., Cohen, S., Pack, S., Chines, A. Risedronate reduces the incidence of vertebral fracture in-patients on chronic corticosteroid therapy. *Arthritis Rheum 1998;41:S136.*

40. Orwoll, E., Ettinger, M., Weiss, S., Miller, P., Kendler, D., et al. Alendronate for the treatment of osteoporosis inmen. *N Engl J Med 2000;343:604–610.*

41. Lyritis, G.P., Paspati, I., Karachalios, T., Ioadimidis, D., Skarantavos, G., Lyritis, P.G. Pain relief from nasal salmon calcitonin in osteoporotic vertebral crush fractures: a double blind, placebo-controlled clinical study. *Acta Orthop Scand 1997;68:112–114.*

42. Jackson, S.A., Tenenhouse, A., Robertson, L. CaMos Study Group Vertebral Fracture definition from population based data. Preliminary results from the Canadian Multi Center Osteoporosis Study CaMos *Osteoporosis International 2000;11:680–687.*

Appendices

Appendix A

Committee Membership

Provincial Osteoporosis Committee Membership

Committee Members

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Nova Scotia Department of Health (DOH)

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Appendix B

Networking to Prevent Falling in Nova Scotia

Networking to Prevent Falling in Nova Scotia

Submitted by:
Community Links

In Partnership with:
The Nova Scotia/Nunavut Command of the Royal Canadian Legion
VON Canada Nova Scotia

Falls Prevention Initiative Phase 3 Funding Proposal
November 2, 2001

Networking to Prevent Falling in Nova Scotia

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Taking Steps to Prevent Falling in Nova Scotia

1. Project Summary

"Networking to Prevent Falling in Nova Scotia", sponsored by **Community Links** in partnership with the **Nova Scotia/Nunavut Command of the Royal Canadian Legion** and **VON Canada Nova Scotia,** is designed to develop a structure and provide tools that will enable seniors', veterans' and health professional organizations to take a population-health-based, multi-strategy approach to preventing falls in the community. Seniors and veterans have provided leadership and been involved in all aspects of the development of this project.

Project goals and objectives are:
Goal
To create a broad-based intersectoral partnership to develop and support sustainable population health and health promotion approaches to preventing falls among seniors, veterans and caregivers in Nova Scotia.
Objective 1. Develop a structure that will enable a wider partnership of organizations from the voluntary sector, government and business to take a coordinated approach to preventing falls in Nova Scotia and will promote a sustained effort to foster a reduction in falls that will continue beyond the funding period of the project
Objective 2. Develop health promotion tools and strategies with a focus on the physical environment and personal health practices that will lower the risk of falling for older persons in Nova Scotia.
Objective 3: Provide the supports necessary for participating organizations to implement falls prevention initiatives.

Based on the literature review in *Taking Steps to Prevent Falling in Nova Scotia* and the outcome of the Falls Prevention Workshop held as part of the Phase 1 Falls Prevention Initiative, the four strategies proposed for this project are:

1. **Network Development**: The project structure is intended to facilitate networking, coordinate falls prevention efforts and foster sustainability. The Management Committee will be responsible for the administration of the project; the Steering Committee will carry out the project objectives and support the Regional Coalitions; and the Regional Coalitions will network and initiate falls prevention activities and programs at the local and regional level.
2. **Tool Kit Development**: The Tool Kit will provide concrete tools to enable groups to take an active role in falls prevention in their communities and will provide a focus for community groups interested in undertaking falls prevention initiatives.
3. **Train-the-Trainer Program**: The Train-the-Trainer Program will have a Community Animation focus, aiming to build community capacity and impart a sense of excitement and enthusiasm around the possibilities for community action to prevent falls.
4. **Public Awareness Campaign**: Our plan is to encourage organizations in the project's network to capitalize on videos and TV ads on falls prevention that are being developed by the National Safety Council. As well, the Tool Kit will contain information on promoting public awareness at a local level.

As the seniors' population grows, so will the need for falls prevention. "Networking to Prevent Falling in Nova Scotia" will contribute to improving the health of the population by developing useable, action-oriented falls prevention materials, training volunteers and health professionals to use them and establishing a network that will allow them to continue to be used following the end of the project.

2. Sponsoring Organizations

This project is sponsored by **Community Links** in partnership with the **Nova Scotia / Nunavut Command of the Royal Canadian Legion** and **VON Canada Nova Scotia.**

Community Links is a charitable association with a membership of 130 community groups and organizations across Nova Scotia. Our mission is to help rural seniors and volunteers share effective ways of meeting the needs and priorities of older residents and promoting healthy communities. Building on the strengths of rural communities and the experience and caring of senior volunteers and organizers, Community Links promotes community development, health promotion and volunteer development.

Our organization acts as an information clearinghouse and catalyst for action, providing networking and learning opportunities, sponsoring projects and linking community-based groups to one another across the province. Community Links works in partnerships at all levels of community action.

By recognizing that how we do things is as important as what we do and what the outcomes are, we've become a strong promoter of cooperative learning and action in rural Nova Scotia. Through Community Links, "Networking to Prevent Falling in Nova Scotia" will establish two-way communication with over 130 community groups relating to seniors and health promotion in all regions of the province. A list of member groups are included as Appendix A. Community Links has two full-time staff and a strong volunteer board made up of rural senior volunteers from around the province. We receive core funding through the Nova Scotia Department of Health and supplement this with various fundraising activities.

Community Links has an excellent track record in project sponsorship:

- New Horizons Community Action Workshops (1995) – Health Canada
- Community Health Partners Project (1996-2000) – McConnell Foundation
- Rural Volunteers Project (2000-2002) – Health Canada
- Working Together to Prevent Falling Among Seniors – Phase 1 (2001)

In addition, Community Links has collaborated on numerous initiatives: Nova Scotia Peer Support Advisory Committee; Setting Our Course NS Organizing Committee; Western Heart Health Partnership (1996-2001); Caregivers Research Project (1998); NS Strong Face of Age Project (1998-2000); Community Caregivers Project Proposal: The Best It Can Be (2000); NS Informal Caregiver Support Committee; NS International Year of Volunteers Planning Committee (2001); NS Health Promotion Clearinghouse (2001); NS Rural Dialogue Conference Planning Committee (2001) and In Support of Shifting Sands (2000-2001).

Community Links has the experience, leadership, skills, interest, network and credibility to sponsor this project.

The Royal Canadian Legion is a highly visible veterans organization formed in 1926 to assist

veterans and their dependants. Although this is a primary concern for the organization, the Legion has also placed a great emphasis in broadening their goals to serve the community and our country. It is a dues-supported with 1680 branches representing 533,000 members nation-wide. Nova Scotia/Nunavut Command is one of 10 Provincial Commands. It is divided into two Districts and 15 Zones with 121 Branches and a membership of 37,000 in the Province of Nova Scotia and Nunavut Territory.

As Canada's largest veterans' and community service organization, the Legion touches hundreds of thousands of Canadians, particularly youth and seniors, every day. The Legion is primarily made up of volunteers from all walks of life who are committed to Remembrance and Service. The Provincial Command contributes to Nova Scotia and Nunavut communities by providing services to veterans, ex-service personnel, seniors and youth, and by supporting numerous community-based charities. Through the Nova Scotia/Nunavut Command of the Royal Canadian Legion, the Falls Prevention Initiative will establish communications with veterans and seniors throughout Nova Scotia.

VON was established in 1897 as a charitable, not for profit organization. The organization began with four branches; one of them located in Nova Scotia. There are now 67 branches across the country. We are proud to serve all areas of Nova Scotia, no matter how remote. **VON Canada Nova Scotia** reaches from the tip of Cape Breton to the Halifax Regional Municipality to Digby Neck and everywhere in between. At the present time, VON has 1000 staff members in Nova Scotia.

Community development is a major commitment of our organization. Through the local advisory boards, VON branches are close to the grassroots in each community we serve. We are also responsive to the changing demographics of our society, particularly the aging population. VON at all levels is working with community partners to address the needs of this growing segment in our society.

In Nova Scotia, VON has been working in collaboration with Home Care Nova Scotia since 1988. Each year, VON makes more than 700,000 nursing and home support visits to Home Care Nova Scotia clients across the province. The services we provide through Home Care include visiting nursing, home support and volunteer services. Some of our branches also provide home support services. Home Support Workers provide clients with personal care, household maintenance and respite care for family caregivers.

Staff are not the only ones to visit patients in the home. Our volunteer visiting program is one of our largest charitable programs. Each year volunteers contribute 30,000 hours to ensure the success of VON programs. Programs vary between the branches depending on community needs. Some of these services include seniors' information lines, volunteer transportation programs, footcare clinics, meals on wheels, palliative care volunteers and adult day programs. Funding comes from United Way, bequests, donations, and fundraising.

On a local and national level, VON is also heavily involved in caregiver initiatives. VON Canada is part of the Canadian Caregivers Coalition and is committed to addressing the unique issues of

people who are the primary caregivers for their loved ones. On a local level many of our branches conduct caregiver workshops and other initiatives.

Over the years, VON has become a well respected charity, with a long and proud tradition of caring. Our history has shown that we take a responsive, adaptable and collaborative approach to addressing the health care needs of our communities. With more than a century of experience, VON is a valuable resource and can offer a unique perspective in addressing health care issues through partnerships, programs and services.

3. Background

Community Links, in partnership with the Nova Scotia/Nunavut Command of the Royal Canadian Legion and the Family Caregivers Association of Nova Scotia (FCgANS), received funding from the Falls Prevention Initiative for a province-wide Phase 1 project titled *Working Together to Prevent Falling Among Seniors*. The goal of the Phase 1 project was to develop a provincial partnership dedicated to reducing the number and severity of falls among seniors, caregivers and veterans. The approach was to increase organizational capacity to address the problem of falls by:

- raising awareness of the issue;
- describing effective ways to prevent falls; and
- developing a multi-sectoral infrastructure to coordinate a province-wide response.

Working Together to Prevent Falling Among Seniors undertook a variety of activities to accomplish its goal:

- Expanded the initial partnership to create a Steering Committee that includes:
  - Canadian Pensioners Concerned Nova Scotia
  - Falls Prevention Program for Lunenburg and Queens Counties
  - Lifeline Canada
  - Northwood Lifeline & Telecare
  - NS Department of Health
  - NS Senior Citizens' Secretariat
  - Queen Elizabeth II Health Sciences Centre
  - School of Occupational Therapy, Dalhousie University
  - Seniors Bridging the Medication Awareness Gap
  - Veterans Affairs Canada
- Produced a professionally researched and written discussion paper titled, *Taking Steps to Prevent Falling in Nova Scotia*. (A copy of the discussion paper is attached.)
- Distributed more than 250 copies of *Taking Steps to Prevent Falling in Nova Scotia*
- Developed a list of provincial and regional organizations that are active, or interested in becoming active, on issues related to falls prevention
- Through the June and Fall issues of the Community Links newsletter and handouts at meetings, undertook an informal survey of the experiences of seniors, veterans and caregivers with falls and falls prevention
- Distributed a series of four articles on population health through the Community Links Newsletter

- Organized and held a provincial partnership-building / strategic planning workshop (September 13 –14) for forty-five people, representing 40 different government and community agencies and organizations. (A list of participants is attached as Appendix B.) Through discussion groups and questionnaires, these participants described the characteristics of a Phase 3 project that would meet their needs and the needs of the seniors they represent or work with. They described the level of the involvement their organizations could commit to and the nature of the supports this involvement would require. Participants also offered ideas about an effective structure, workable strategies and ways to sustain the project after the funding period has ended.

The outcome of the Phase 1 project has been to develop a well-organized process and a framework to support broad involvement in making the decisions on which this Phase 3 proposal has been based.

4. Project Description

This project arises from research findings described in *Taking Steps to Prevent Falling in Nova Scotia* and the insights and ideas provided by participants in the Falls Prevention Workshop that was developed as part of Phase 1.

Taking Steps to Prevent Falling in Nova Scotia makes several points regarding approaches for which there is at least preliminary research support:

- training health care workers who interact with seniors may be a more effective approach as education programs aimed directly at seniors have not been effective on their own
- reducing environmental hazards is an important component of successful, multiple-strategy falls prevention programs
- trained health visitors can effectively screen older people and reduce the risk of falling

The discussion paper further points out that because most falls among seniors are due to a combination of factors, strategies that combine several approaches have a far greater impact than those based on a single approach. Using multiple strategies is an important component of a population health approach as well as of health promotion.

Participants in the Falls Prevention Workshop included representatives from seniors, caregivers, veterans, and health professional organizations. Government, District Health Authority and Community Health Board representatives were also present. (A list is included as Appendix B.) Recurring themes that emerged from the workshop included:

- Participants wanted to be involved, to be part of a flexible structure that kept them "in the loop" and allowed them to participate at varying levels of intensity and commitment. They wanted a structure that built on existing networks and didn't keep "reinventing the wheel."
- They wanted tools and training in how to use them. They wanted tools that would enable people in their organizations to reach out into their community or organization and make a difference.
- They wanted support to help them get started and ideas for keeping falls prevention projects going after the funding period has ended.

- They wanted help in raising both public and professional awareness of the issue of falls and falls prevention.

This project is designed to develop a structure and provide tools that will enable community and health professional organizations to take a population-health-based, multi-strategy approach to preventing falls in the community.

Based on the literature review in *Taking Steps* and consultations during the Falls Prevention Workshop, the four strategies proposed for this project are: Network Development; Tool Kit Development; Train-the-Trainer Program; and Public Awareness Campaign.

Network Development

As requested by participants in the workshop, this project proposes to build on existing networks, developing a three-level organizational structure designed to facilitate network development and a coordinated approach to falls prevention.

Management Committee: The Management Committee will be made up of the project's Sponsoring Organizations -- Community Links, the Nova Scotia/Nunavut Command of the Royal Canadian Legion and VON Canada Nova Scotia. These organizations have agreed to be accountable for the project and to oversee the day-to-day management aspects, such as budgeting and staffing. The Steering Committee of the Phase One Project has formally named Community Links as the lead group in submitting this Phase 3 proposal.

Steering Committee: The role of the Steering Committee will be to carry out the activities required to meet project objectives. The Steering Committee will have 12 to 15 members, including representatives of the three Sponsoring Organizations and representatives of organizations selected from those who have offered to participate at this level of the project. Steering Committee members will be selected to represent as wide a spectrum of seniors', veterans', caregivers', community and health professional groups as possible.

To expand the network and carry out activities, the Steering Committee will have standing committees which could include: Networking; Tool Kit Development; Train-the-Trainer Program Development; and Public Relations. There will also be an Evaluation Committee to address evaluation issues through out the duration of the project in consultation with the Steering Committee.

The Steering Committee will also have the capacity to strike Working Groups to address issues and opportunities with province-wide implications as they emerge over the course of the project.

Participation on both Standing Committees and Working Groups will not be limited to Steering Committee members, but will be expanded to include other groups and individuals with interest or expertise to contribute.

The groups interested in a role on the Steering Committee include: Nova Scotia Senior Citizens' Secretariat; Canadian Pensioners Concerned; VON; Falls Prevention Program for Lunenburg and

Queens Counties; Queen Elizabeth II Health Sciences Centre; School of Occupational Therapy, Dalhousie University; Seniors Bridging the Medication Awareness Gap Project; Acadian Federation of Nova Scotia; Wolfville and Area Safe Communities Coalition; Family Caregivers Association of Nova Scotia; and the School of Nutrition and Dietetics, Acadia University. Representatives of Veterans Affairs Canada, Health Canada and the Nova Scotia Department of Health will also be asked to participate on the Steering Committee.

The three sponsoring organizations bring large networks to this project -- Community Links, with 130 member groups; the Nova Scotia/Nunavut Command of the Royal Canadian Legion, with 119 branches; and VON Canada Nova Scotia, with a province-wide network of staff and volunteers, comprise a substantial provincial network in and of themselves. Building on this comprehensive base, the organizations and agencies participating on the Steering Committee will provide access to additional community and professional networks.

Regional Coaltions: Our project proposes to build on this foundation of existing networks to reach and involve a widening circle of communities and organizations through establishing nine Regional Coalitions to correspond roughly with the District Health Authority areas. The role of the Regional Coalitions will be to offer networking and support for capacity building at the local and regional levels in order to build a solid base for sustaining falls prevention beyond the duration of the project. It is at the Regional Coalition level that community-based groups who offer direct programs and services for veterans, seniors and caregivers will be involved. The networking and support at this level will enable local organizations to initiate, strengthen and/or expand programs and services. For example, community groups could build on one another's experiences to enlist volunteer firefighters to include a falls safety audit in their fire safety inspections in senior's homes and public buildings and to follow up by developing mechanisms to assist seniors in making necessary repairs.

Like the Steering Committee, Regional Coalitions will have the capacity to establish Working Groups to address issues as they arise. These Working Groups could be regional or local in scope and will give the project the flexibility to connect community groups with whatever expertise, advice, resources or assistance they might need to meet challenges or capitalize on opportunities that arise in the course of the project.

Participants in the Falls Prevention Workshop identified financial support as an important factor in enabling their participation in falls prevention efforts at both local and regional levels. To the extent possible, the proposed budget for this project will include provisions for reimbursement of travel and out-of-pocket expenses incurred during participation in the activities of Regional Coalitions, as well as support for the costs of materials needed for falls prevention programs.

At the Falls Prevention Workshop, at least eight organizations indicated interest in being involved in the project in ways other than being on the Steering Committee, many specifying involvement in Regional Coalitions as of interest to them. In addition, representatives of Community Health Boards and District Health Authorities who participated in the workshop stated that while they could not formally commit their organizations, they anticipated that their agencies would be interested in participating in the project.

To summarize, the project structure is intended to facilitate networking and foster sustainability. The Management Committee will be responsible for the administration of the project; the Steering Committee will carry out the project objectives and support the Regional Coalitions; and the Regional Coalitions will network and initiate falls prevention activities and programs at the local and regional level.

Tool Kit Development

During the Falls Prevention Workshop, 30 participants answered a question regarding the supports their organization would need in order to move the falls prevention initiative forward. Of these 30 respondents, 24 requested some form of "Tool Kit" or communication package. They asked for concise and credible information that would enable them to educate and communicate effectively with other seniors and health professionals as well as with the general public. They also asked that the Tool Kit contain more than just educational and promotional material. They wanted concrete tools that would enable them to take an active role in falls prevention in their communities -- such as home and neighbourhood safety/falls prevention checklists -- and ideas and directions for involving other community members in supporting falls prevention initiatives.

This project takes the view that the development of a comprehensive, action-oriented Tool Kit will provide a focus for community groups interested in undertaking falls prevention initiatives. Our plan is to take a population-health approach to the Tool Kit development and include information that will facilitate local capacity building. Preliminary suggestions for Tool Kit materials include:

- a presentation package, including background notes, overheads and power-point presentations
- posters and other promotional material
- pamphlets and educational materials
- home and neighbourhood safety audit tools and checklists
- a series of modules designed to meet the specific needs of different groups of users -- e.g., community, health professionals, business, university
- information and ideas for contacting and involving other community organizations
- information on community development and capacity building
- information on advocacy for safe and healthy public policy -- e.g., how to approach municipal councils on issues, such as by-law enforcement, that are related to falls prevention in the community
- how to write press releases and other public relations materials

The Tool Kit will be professionally developed and designed in consultation with Steering Committee members and Regional Coalitions. Where possible, the Tool Kit will use existing educational materials. The intent is to develop a resource that is flexible, relevant and easy to use and understand and that will continue to be used after the project has been completed.

Participants also suggested the use of a website as a resource for public education and awareness and for circulating materials developed as part of the Tool Kit. Several organizations, including

CHPNA, Heart Health Nova Scotia and the Seniors' Secretariat have offered the use of their websites as a home for falls prevention information. As well, other groups at the Steering Committee and Regional Coalition levels have offered to put links to falls prevention material on their websites.

•Train-the-Trainer Program

In addition to the provision of a Tool Kit for Falls Prevention, participants also wanted training in how to use it's action-oriented components effectively to reach as many seniors, veterans and caregivers as possible. As well, research done for *Taking Steps* indicated that delivering information and training to health professionals and others who work or interact with seniors would strengthen approaches addressed directly to seniors. For these reasons, the project will include the design and implementation of a Train-the-Trainer Program.

The Train-the Trainer Program will involve more than simply familiarizing participants with the contents of the Tool Kit. The goal will be to build community capacity by recognizing and expanding on participants' life experience, improving facilitation and advocacy skills, and imparting a sense of excitement and enthusiasm around the possibilities for community action to prevent falling. In support of the action-oriented approach of the Tool Kit, the Train-the-Trainer Program will have a community animation focus and be developed and implemented by a community animator.

The program will initially be delivered to volunteers from the networks of the Sponsoring Organizations and Steering Committee members, with the aim of offering three Train-the-Trainer Workshops. These Trainers will, in turn, train volunteers from the Regional Coalitions in how to use the Tool Kit to offer Falls Prevention programs in their communities or to members of their professional association. In this way, the project will "seed" volunteers interested in, and able to offer, falls prevention programs to seniors in communities throughout the province.

To increase the sustainability of the program, the Training Program will include two support workshops to reinforce and expand on the initial training workshop. These will occur three months after the initial Training Program (for the first generation of trainers) and six months after the initial Training Program (for the initial trainers and the additional trainers they, in turn, will have trained). The follow-up workshops will focus on mutual support, problem solving and additional training and will provide an opportunity for the trainers to meet one another.

•Public Awareness Campaign

One of the strategies proposed by participants in the Falls Prevention Workshop was the development of a public education campaign to raise awareness about both the importance of preventing falls and what can be done to prevent falls. They suggested a campaign that is not specifically for seniors, but aimed at population as a whole. The focus would be that the safety precautions that prevent falls for seniors are a good idea for all of us.

Another facet of raising public awareness proposed by workshop participants was the development of a logo, symbol and/or slogan to raise the profile of the project and identify

products the project develops or supports -- to essentially give the project and the issue of falls prevention an easily recognized identity.

Developing a mass-media campaign is beyond the scope of this project. However, our plan is to encourage organizations in the project's network to capitalize on videos and TV ads on falls prevention that are being developed by the National Safety Council. As well, the Tool Kit will contain information on promoting public awareness at a local level, for example, on organizing promotional events at local supermarkets or arranging for information to be inserted in utility bills.

5. Goals and Objectives

The outcome of this project will be the development of a flexible, sustainable, province-wide network of community, senior's, veteran's, caregiver's and health professional organizations and the provision of the tools and training these groups need to build their capacity to develop and implement falls prevention programs.

To achieve this outcome, the project will have to meet several objectives directed at:

- establishing a sustainable structure to support networking; and
- developing strategies to raise awareness of falls prevention, build community capacity and enable governments, organizations, businesses and individuals to take action.

These objectives and strategies were developed by the Phase 1 Steering Committee and refined by participants in the Phase 1 Falls Prevention Workshop.

Goal

To create a broad-based intersectoral partnership to develop and support sustainable population health and health promotion approaches to preventing falls among seniors, veterans and caregivers in Nova Scotia.

Objective 1. Develop a structure that will enable a wider partnership of organizations from the voluntary sector, government and business to take a coordinated approach to preventing falls in Nova Scotia and that will promote a sustained effort to foster a reduction in falls that will continue beyond the funding period of the project.

Operational Activities

1.1 Set up office and administrative structure for the project.
1.2 Hire Project Coordinator
1.3 Hire contractors: Writer; designer; artist; community animation consultant
1.4 Oversee on-going operation and management of project

Networking Activities

1.1 Name members to Steering Committee
1.2 Establish Steering Committee Standing Sub-committees
1.3 Develop Regional Coalitions

1.4 Build on existing networks and the Phase 1 Partnership to develop a structure that will support and sustain a province-wide network.

Objective 2. Develop health promotion tools and strategies with a focus on the physical environment and personal health practices that will lower the risk of falling for older persons in Nova Scotia.

Activities: Tool Kit Development

2.1 Consultation to determine content, approach and format of Tool Kit materials: Consultation will be done through the Steering Committee members who will be asked to consult, in turn, with the groups they represent.
2.2 Research, writing and development of Tool Kit: A professional writer/researcher will be hired to ensure that the Tool Kit is easy to read, understand and use.
2.3 Pre-testing of Tool Kit content: The Tool Kit development process will include an informal pre-testing process to ascertain that the materials are, in fact, readable, useable and understandable by their intended users. Any problems discovered at this point can be remedied before the materials are finalized.
2.4 Design and layout of Tool Kit: A professional designer and an artist will be engaged to provide design, layout and illustration for the Tool Kit.
2.5 Production of Tool Kit: Printing and assembly of the materials.
2.6 Distribution of Tool Kit: Tool Kits will be distributed through the Train-the-Trainer workshops as well as by mail.

Objective 3: Provide the supports necessary for participating organizations to implement falls prevention initiatives.

Activities: Train-the-Trainer Program

3.1 Develop Training Program: A Community Animation Consultant will be contracted to develop the Train-the-Trainer Program in consultation with the Steering Committee.
3.2 Organize and hold Training Workshops
3.3 Organize and hold 3-month follow up meeting
3.4 Organize and hold 6-month follow up meeting

Public Awareness Campaign

3.5 Seek out appropriate videos and PR materials
3.6 Consult with Steering Committee Member Groups and Regional Coalitions to develop a coordinated PR approach
3.7 Implement Public Awareness Campaign

6. Partnerships and Intersectoral Collaboration

Partnerships and intersectoral collaboration are central to the success and sustainability of this project. We take the view that our role is to ensure that opportunities and supports are available to enable potential partners to participate at whatever level seems to them to be appropriate and

beneficial. Participants in the Falls Prevention Workshop asked for a flexible approach that would allowed them to participate with different degrees of intensity over time -- to come and go based on the needs of their members and communities. We recognize that building and maintaining flexible partnerships requires a significant commitment of time and energy to explore common ground and to develop mutual understanding and strategies. We also recognize that this type of partnership development is essential for the continuation of the project beyond the funding period.

Sponsoring Organizations have been described in Section 2. Section 4 contains a list of the organizations expressing interest in participating as partners on the Steering Committee and/or Regional Coalitions. These groups represent seniors, veterans, caregivers, health professional, community, and health care organizations, as well as government, and demonstrate the intersectoral nature and approach of this project.

The roles of partners participating at each level of the project have been described in Section 3.

All partners will contribute towards reaching the goals and objectives of the project by bringing and building on their existing networks and expertise. Partners participating at the Steering Committee level will contribute towards reaching the goals and objectives of the project by overseeing the activities of the project -- developing the Tool Kit, the Train-the-Trainer program and the public education campaign. Partners at the Regional Coalition level will provide volunteers to be trained in using the Tool Kit and will continue to build links and collaborations with other community resources and groups.

Seniors and veterans have been involved in every facet of the planning and development of this project. The Phase 1 Project Steering Committee, whose members are listed in Section 3, is made up of representatives of seniors', veterans', community, health and government organizations. Participants in the Falls Prevention Workshop also represent this range of organizations. (The list of participants is attached as Appendix C.) These groups will continue to participate in all levels and stages of the planning and implementation of this project.

7. Determinants of Health

This project is based on the idea that population health approaches can act as mediating structures between individuals and the broader community. This project's goal is to develop a sustainable network that will enable it to deliver materials and training to seniors, veterans, caregiver, health professional and community organizations across the province. These groups will, in turn, train volunteers and health professionals who will offer services, support, education and assistance tailored to meet the needs of seniors in their communities. The Phase 1 Proposal submitted by Community Links and its partners described the many ways that a comprehensive Falls Prevention program can impact on a range of Determinants of Health. These are listed in the adjacent box.

Physical Environments (Home)
- Floor and staircase surfaces and repair
- Safety rails and bars
- Lighting
- Safe walkways
- Programs to subsidize home repairs and renovations for those at risk

Physical Environment (Community)
- Street cleaning and snow removal
- Sidewalk repair and maintenance
- Crosswalk timing
- Floor and staircase surfaces and maintenance in public buildings

Social Environments
- Cohesive communities
- Safety consciousness
- Positive attitudes toward seniors and people with different levels of ability

Social Support Networks
- The number and variety of people seniors can turn to for help when they are no longer able to safely perform tasks such as snow removal or changing a ceiling light bulb

Health Services
- Availability of screening programs for seniors at risk
- Availability of falls prevention information through the health care system
- Programs to reduce over-medication of seniors
- Programs to increase access to mobility aids

Personal Health Practices and Coping Skills
- Physical activity and nutrition throughout life as relates to osteoporosis prevention
- Regular and well-balanced meals in later life as relates to dizziness and weak spells
- Regular check-ups and medication reviews
- Appropriate physical activity
- Well-fitting footwear in good repair
- use of eye glasses and mobility aids
- Willingness and ability to ask for help with tasks no longer safely performed

Phase 1 Grant Proposal: Working Together to Prevent Falling Among Seniors, p. 4

The project plans to influence Social Environment and Social Support Network Determinants through extensive networking and coalition building around the issue of Falls Prevention -- on a regional and local level through the Regional Coalitions. The information and Training provided through the Tool Kit and Train-the-Trainer program will enable groups throughout the province to influence:

- Physical Environments (both home and community)
- Social Support Networks and Social Environments (in their community or organization)
- Health Services (through direct involvement by health professionals, DHAs and CHBs, and indirectly through advocacy for policy change by community groups)
- Personal Health Practices and Coping Skills (directly, through programs offered to seniors in their communities and

indirectly, through programs and training offered to health professionals and others who work with seniors)

Life Stage Priorities

This project is directed at veterans, seniors and their caregivers and is aimed at preventing falls among seniors. Nova Scotia has a relatively large and growing population of seniors, with the percentage of seniors in the population larger in rural areas. (NS Statistics are shown in the adjacent box.)

Nova Scotia's Seniors (65+): Characteristics

- **Current Population**
  - 24, 138 seniors live in Nova Scotia out of a total population of 940, 996.
  - 13.2 % of Nova Scotians are seniors.
- **Gender Breakdown:**
  - Women: 58.2 % of seniors
  - Men: 41.8 % of seniors
- **Rural/Urban Distribution**
  - Rural areas in NS are much older than urban areas
    - Urban seniors: In HRM, 10.5 % of population are seniors
    - Rural seniors: 12 other NS counties have seniors' populations of 14 % or more
- **Projected Senior Population:**
  - By 2010, NS seniors will number 147,000 (15.3 % of pop.).
  - By 2025, NS seniors will number 233, 000, (23.9 % of pop.).
- **Relative Rankings**
  - NS has the largest seniors population in the Maritimes.
  - NS has the third largest seniors population in the country
    - #1. Saskatchewan: 14.5 %
    - #2. Manitoba: 13.5 %
    - #3. NS: 13.2% seniors

(Source: Nova Scotia Seniors Secretariat: Statistics Canada, 2000)

Through the groups represented on the Management and Steering Committees and those who will be involved in the Regional Coalitions, the project will have the potential to reach many high-risk seniors, particularly veterans and rural seniors.

As the senior population grows, so will the need for falls prevention. By developing useable, action-oriented falls prevention materials, training volunteers and health professionals to use them and establishing a network that will allow them to continue to be used following the end of the project, the project will contribute to improving the health of the population.

8. Workplan

The project Workplan, describing activities, time frame, required resources and who is responsible for each activity, is attached as Appendix C. Appendix C also contains a compilation of the initial contributions participants in the Falls Prevention Workshop envisioned making to the project.

9. Evaluation Plan

A preliminary evaluation plan is attached as Appendix D. Community Links believes in an on-going, participatory evaluation process that provides results and learnings that can be used to improve and adapt all aspects of the project as they evolve. The goal of the participatory evaluation process will be to identify strengths, weaknesses and unintended outcomes in order to make whatever changes are necessary to facilitate the survival and sustainability of the network. On-going evaluation will be an integral part of each aspect of the project's work -- network development, Tool Kit development, Train-the-Trainer Program development and implementation and the Public Awareness Campaign.

Pre-testing to assess the accuracy, completeness, relevance, readability and usability of the printed materials in the Tool Kit will be an important aspect of its development.

As well, the project will participate in National Program Evaluation developed by the National Falls Prevention Management Committee. We plan to contract with a professional Evaluation Consultant to evaluate the project.

10. Dissemination Plan

This project is designed to build capacity in seniors', veterans', caregivers', health professional and community organizations, and through them, to reduce the incidence of falls among seniors in Nova Scotia.

The concrete result of this project will be the Tool Kit, which will be disseminated to all branches and member groups of the organizations participating in the project and to everyone participating in the Train-the-Trainer Program. As well, the contents of the Tool Kit will be posted on a website allowing access to this information following the end of the project.

The Train-the Trainer Program will be disseminated through workshops and follow-up sessions offered over the course of this project.

11. Project Sustainability Plan

The network whose development is at the heart of this project has been designed to enable the project be sustained after funding period. The materials that will be produced and the training provided will build the capacity of organizations and individual volunteers to implement falls prevention initiatives. Our plan is to sustain the interest in falls prevention through:

- Integration of falls prevention as a priority for on-going action into the mission statements, workplans and job descriptions of network members
- Project materials that will be available in communities and through the Senior's Secretariat Resource Center as well as on the web
- Volunteer trainers who will be spread throughout Nova Scotia

- Regional Coalitions that will be in place to support and assist with Falls Prevention Initiatives

12. Budget

The project budget and explanatory notes are attached as Appendix E. The budget includes all costs relating to project activities, evaluation and dissemination of results, as well as contributions from other sources.

13. Letters of Support

Letters of support from the following organizations, describing their role and commitment to project, are attached as Appendix F:

Appendices

- Appendix A: Community Links Member Organizations
- Appendix B: Falls Prevention Workshop Participants List
- Appendix C: Workplan and Involvement Interests of Workshop Participants
- Appendix D: Evaluation Plan and Logic Model
- Appendix E: Budget and Budget Notes
- Appendix F: Letters of Support

Attachments

Taking Steps to Prevent Falling in Nova Scotia

Appendix C

Report on an Osteoporosis Survey in Long Term Care

Report on an Osteoporosis Survey in Long Term Care
Prepared for the Provincial Osteoporosis Committee

Prepared and submitted by:

Anne Erly
Long Term Care Advisor,
Department of Health

Submitted to:

Brenda Payne
Chair, Provincial Osteoporosis Committee

Date: November 2, 2001

Osteoporosis Survey: Long Term Care

Purpose

There is a recognized increase in acuity and frailty of residents in nursing homes, which in turn increases the risk for falls and fractures. As part of its work, the Provincial Osteoporosis Committee requested that information be gained on the current status of prevention and treatment programs in long term care facilities in Nova Scotia with respect to issues around osteoporosis. To achieve this, a survey was developed to gain statistics on the numbers of residents receiving calcium and vitamin D supplements, both separately and in combination. The survey also sought to gain information on the existence of policy re: calcium and vitamin D supplementation, risk management indicators, and specific programs to promote strength and maintain muscle strength.

Method

A nine-question survey was faxed to all 74 licensed nursing homes and homes for the aged. 69 responses were received for a response rate of 93.2%. At the time of the survey, 5702 0f 5918 nursing home beds were occupied/available. 216 beds were unavailable due to major construction projects in 2 facilities. The results of the survey represent 5224 residents residing in these 69 homes or about 95% of all residents.

Results

Calcium supplements:	527 (10%) of residents receive a calcium supplement of whom 473 (9%) are female and 54 (1%) are male. Most calcium supplements are administered in tablet form.
Vitamin D supplements:	252 (4.8%) of residents receive a vitamin D supplement of whom 227 (4.3%) are female and 25 (0.5%) are male. Most vitamin D supplements are administered in tablet form.
Combination:	Of the residents receiving supplements, 216 (4%) receive calcium and vitamin D in combination, of whom 198 (3.7%) are female and 18 (0.3%) are male. One facility, North Queens Nursing Home, has initiated a program of daily supplementation of calcium and vitamin D offered to all residents.
Policy:	3 facilities have a policy for the supplementation of calcium and vitamin D.

Statistics:	60 facilities (87%) maintain statistics and or records of resident falls. 55 facilities (80%) maintain statistics on fractures.
Prevention:	27 facilities (39%) provide recreation or physiotherapy activities with weight resistance. 62 facilities (89.9%) provide walking programs, individualized to the resident to maintain strength. 28 residents (0.5%) of residents wear hip protectors as a preventative measure.

Conclusions:

The long term care industry in Nova Scotia is committed to the provision of quality care for residents. The 93.2% response rate of this survey indicates the priority that is placed on issues of care and safety. Many comments were added to surveys, which demonstrated a desire to investigate supplementation and prevention programs. Due to time constraints, it was not possible to report on the specifics of these comments. The majority of facilities that responded maintain statistics and data on resident falls and fractures. This already-established practice provides retrospective data that could potentially be used to examine trends, make comparisons and draw conclusions.

Osteoporosis Survey: Long Term Care
November 2, 2001

District	1	2	3	4	5	6	7	8	9	All	%
Total # facilities	7	7	6	3	5	4	7	18	17	74	
Total # responses	6	6	6	3	4	4	7	17	16	69	93.2%
Total # beds/district	450	489	489	240	223	456	359	1106	1890	5702	
Total # residents/response	374	411	483	240	128	456	350	1010	1772	5224	94.5%
# females: calcium	64	43	23	7	18	23	27	98	170	473	9%
# females: vitamin D	61	13	3	2	9	12	21	46	63	227	4.3%
# females: combination	57	8	7	2	9	10	18	43	44	198	3.7%
# males: calcium	9	7	3	1	0	3	6	16	9	54	1%
# males: vitamin D	9	1	1	1	0	3	6	2	2	25	0.5%
# males: combination	9	0	1	1	0	1	4	2	0	18	0.3%
# facilities: policy	1	0	0	0	0	0	0	2	0	3	4.3%
# facilities w/stats for falls	5	4	5	3	4	4	7	13	15	60	87%
# facilities w/stats for fractures	5	3	5	3	4	3	7	13	12	55	80%
# residents w/hip protectors	7	1	7	4	0	1	2	1	5	28	0.5%
# facilities w/ wt. resistance activities	4	0	1	0	1	3	4	10	4	27	39.1%
# facilities w/indiv. walking programs	5	6	3	2	4	4	6	17	15	62	89.9%

SURVEY ON OSTEOPOROSIS

To be completed by: ~~DOC/ADOC (or designate):~~ _____

Nursing Home: _____
Number of Residents: _____

QUESTIONS:

1.(a) Of your total number of residents, how many receive calcium supplements?
#females #males

(b) What form? i Food additive ☐
ii Tablets ☐

2. (a) Of your total number of residents, how many receive Vitamin D supplements?
females # males

(b) What form? i Food additive ☐
ii Tablets ☐

Regarding the above information:

3. How many of these residents receive Calcium and Vitamin D in combination?
females # males

4. Does your facility have a policy on Calcium and Vitamin D supplements for the prevention of Osteoporosis?

YES ☐ NO ☐

If No, please explain.

_____

_____

5. Does your facility keep statistics on resident falls?

YES ☐ NO ☐

6. Does your facility keep statistics on fractures?

YES ☐ NO ☐

7. How many residents wear hip protectors for the prevention of fractures due to high risk of falls?

_____

8. Does your facility provide recreation programs which include weight resistance activities, such as hand weights or resistance bands?

YES ☐ NO ☐

9. Does your facility have individualized walking programs for residents to maintain strength?

YES ☐ NO ☐

If yes, who provides? (Check all that apply)

Nursing staff ☐ Physio staff ☐ Recreation staff ☐

Additional Comments:

_____

_____

_____

_____

Signature of DOC/ADOC Date

Thank you for completing this important survey.

Appendix D

Summary of the Calcium and Vitamin D Supplementation Initiative

North Queens Nursing Home

Summary of the Calcium and Vitamin D Supplementation Initiative

North Queens Nursing Home
Caledonia, Queens County
No. of Beds - 44 (including 2 Respite Beds)

The following information has been compiled from discussions with the facility's Medical Director, Dr. Guy LeFebvre; the facility's pharmacist, Dan Ramey; the facility's nutritionist, Pascal Love; and the facility's administrator, Norma Lenco.

Consent:
All residents were offered daily supplementation of calcium and vitamin D. Two residents declined because they were taking Didrocal® and two residents declined because they were palliative.

Evaluation:
When this initiative was started, a number of the residents consented to have their bone mineral density (BMD) measured. After a year of supplementation, BMDs will be measured again.

Products Used:
Residents who consented to supplementation receive a daily supplement of calcium and vitamin D as follows:

1,500mg elemental calcium (= 3,750mg calcium carbonate)
Calcium carbonate heavy powder (Wyler Chemical) is administered in vanilla pudding. To prevent any potential confusion, vanilla pudding is only served in this facility for calcium and vitamin D supplementation. The kitchen prepares a fresh supply of vanilla pudding each day. The kitchen then makes a bulk batch of pudding containing calcium carbonate by measuring a specified quantity of calcium carbonate powder[1] and a specified quantity of pudding. The two are thoroughly mixed so the resulting mixture contains 3,750mg calcium carbonate per tablespoonful of pudding.

828.8 I.U. vitamin D
Drisdol® drops (Sanofi-Synthelabo), containing 8,288 I.U./mL are used. Each patient is given 0.1mL (= 828.8 I.U.). This dose is measured using a tuberculin syringe and is extruded on the surface of the 1 tablespoonful serving of vanilla pudding.

---

[1] 3,750mg calcium carbonate powder (Wyler Chemical) = 1 level teaspoonful

Administration:
The calcium and vitamin D are administered just before lunch with the ac med pass. Using a standard measure, 1 tablespoonful of pudding containing the calcium carbonate is measured by the LPN or nurse. 0.1mL Drisdol® drops is measured and extruded on the top of the pudding. The resident takes, or is fed, the pudding serving.

Cost:
Calcium carbonate powder (Wyler Chemical) is supplied by the pharmacy in 500g bottles at a cost of about $8.00/bottle. One bottle provides about 133 doses. Therefore, the cost per dose (or per day) is approximately $0.06.

Drisdol® drops are supplied by the pharmacy. One 60mL bottle of Drisdol® drops costs about $27.00 and provides about 600 doses. Therefore, the cost per dose (or per day) is approximately $0.045.

The cost for this method of calcium and vitamin D supplementation is approximately 10.5¢/resident/day.

Appendix E

Guidelines for Bone Density Testing

Nova Scotia Guidelines

Bone Mineral Density Testing Flowchart

These guidelines were developed by the Provincial Osteoporosis Committee.

General

- No Risk Factors
- Previous Normal BMD without significant clinical changes
- BMD result would not alter clinical management

STOP

Radiographic Findings

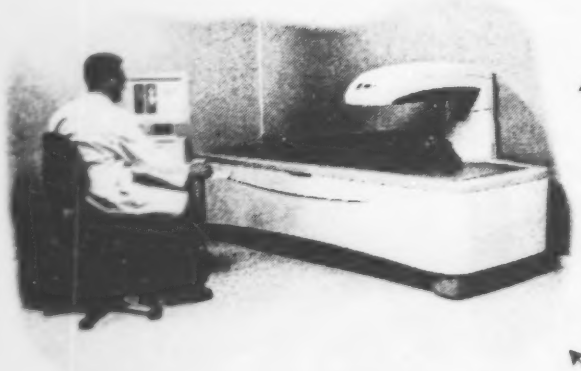
- Vertebral compression fracture (low impact trauma), even if incidental
- Fragility fracture (low impact trauma) ≥ age 40 (♂ or ♀)
- Osteopenia or demineralization on x-ray

Post-Menopausal ♀

- Fragility fracture (any age)
- Age ≥ 50 with ≥ 2 Risk Factors (see verso)
- Age ≥ 65

♂ ≥ 65

- With any risk factor (see verso)



Children

- BMD should be ordered only on the advice of a qualified specialist

2° Osteoporosis

- Prednisone ≥ 3 months
  - ≥ 7.5 mg/day (or dose equivalent)
  - ≥ 5 mg/day in Rheumatoid Arthritis
- See list of Diseases / Treatments on verso

Repeat Testing

- Anti-resorptive agents ≥ 1yr
- Normally, not more often than Q2yr on HRT
- Steroid Treatment: Baseline and at 6 mo.

See verso for specific Osteoporosis Risk Factors and Secondary Causes

Contact:
Acute Care,
Nova Scotia Department of Health
1-800-387-6665

NOVA SCOTIA
Department of Health

Osteoporosis Risk Factors and Secondary Causes

for use with Flowchart

- *When ordering BMD studies consideration should be given to how the test will change the patient's management, such as altering counselling regarding activity or changing the therapy.*

Risk Factors for Osteoporosis and Fractures in Men [no clear consensus]

- Hypogonadism
- Low BMI
- Poor lifestyle (i.e., smoker, poor nutrition, alcohol abuse)

Risk Factors for Osteoporosis and Fractures in Women

- History of fragility fracture after age 40
- History of hip, wrist or vertebral fracture in first-degree relative
- Caucasian race
- Dementia with increased likelihood of falls
- Poor general health/fragility
- Current cigarette smoking
- Low body weight (< 57.8 kg or < 127 lbs)
- Early menopause (< age 45)
- Bilateral oophorectomy
- Prolonged premenopausal amenorrhea
- Low calcium intake
- Alcohol abuse
- Recurrent falls
- Sedentary lifestyle

Diseases or Treatments that May Cause Osteoporosis in Children and Adults

- **Endocrine**
  - Acromegaly
  - Addison's Disease
  - Cushing's Syndrome
  - Gonadal insufficiency
  - Hyperparathyroidism
  - Hyperthyroidism
  - Insulin-dependent diabetes
  - Turner's Syndrome
- **Gastrointestinal**
  - Celiac Disease
  - Crohn's Disease
  - Gastrectomy
  - Malabsorption syndromes
  - Nutritional disorders
  - Parenteral nutrition
  - Severe liver disease, especially primary biliary cirrhosis
  - Cystic Fibrosis
- **Hematological**
  - Congenital Porphyria
  - Hemochromatosis
  - Hemophilia
  - Lymphoma and Leukemia
  - Multiple Myeloma
  - Pernicious anemia
  - Thalassemia
- **Renal**
  - Renal failure
  - Renal transplant
- **Respiratory**
  - Sarcoidosis
  - COPD
  - Cystic Fibrosis
- **Drugs:**
  - Adrenocorticotropin
  - Aluminum
  - Anticonvulsants
  - Chemotherapy/Cytotoxic drugs
  - Excessive thyroxine
  - Glucocorticosteroids
  - Prolonged DepoProvera use in teens
  - Heparin
  - LHRH analogs (used for prostrate cancer)
  - Lithium
  - Tamoxifen (premenopausal use)
  - Anti-rejection drugs (post transplantation)
- **Miscellaneous**
  - Amyloidosis
  - Anorexia Nervosa
  - Endometriosis
  - Epidermolysis Bullosa
  - Hypophosphatasia
  - Mastocytosis
  - Multiple Sclerosis
  - Poor health/fragility
  - Osteogenesis Imperfecta
  - Post-transplant
- **Neurological**
  - Duchenne's Muscular Dystrophy
  - Cerebral Palsy
  - Quadriplegia
  - Non-weight bearing/Neuromuscular diseases
- **Rheumatological**
  - Ankylosing Spondylitis
  - Idiopathic Scoliosis
  - Rheumatoid Arthritis

Bone Mineral Density Testing in Children

Please Note:

There are few reports in the literature to support the use of bisphosphonate therapy in children and adolescents, although there is an accumulating literature of case series of treatment of severe osteoporosis. The experience at the IWK has shown a positive benefit, but the experience has been only with very severe cases. The long term safety of this medication in the growing skeleton is not clearly established, although it does not appear to interfere with normal growth, and vertebral bodies which have sustained wedge fractures show reconstitution of their shape during therapy, with improvement of BMD.

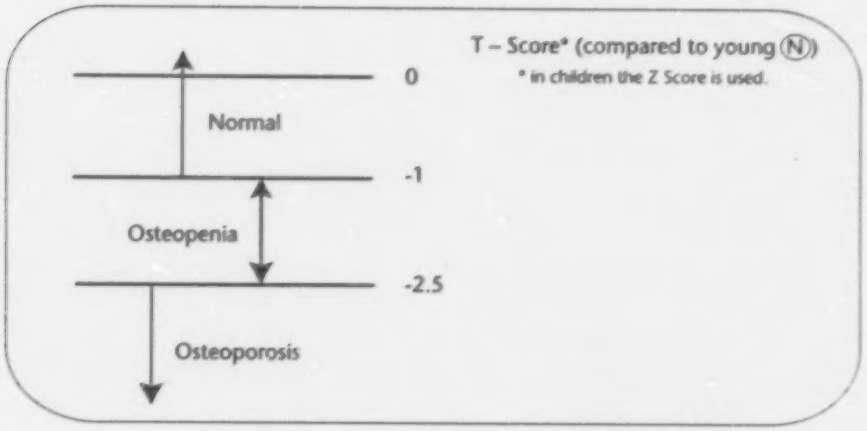
The use of bisphosphonates in young girls and women of child bearing age, and future potential effects on a developing fetus have not been established.

Bone mineral density studies are indicated for:

- Management of symptomatic osteoporosis in children and adolescents
- Management of rare bone metabolic disorders such as osteogenesis imperfecta
- Detection of osteoporosis in children/adolescents with diseases/therapies known to affect the bone density. Special attention should be paid to children on chronic glucocorticoid administration ≥ 3 months

BMD in childhood should only be ordered on the recommendation of a pediatrician or other specialist with a special interest in metabolic bone diseases.

World Health Organizaton Criteria for Osteoporosis



PREVENTION OF OSTEOPOROSIS

- The most important factors in preventing osteoporosis are attaining peak bone mass during childhood and adolescence and maintaining bone mass thereafter.
- Attainment of peak bone mass depends on genetic/ethnic factors, hormonal factors and diet and activity during the late childhood and adolescent years. The peak rate of bone mass accrual occurs in early to mid puberty and declines thereafter (similar timing to the adolescent growth spurt). *Optimizing diet and activity level at this stage would have the most significant impact in preventing osteoporosis.*
- Increasing dietary calcium and vitamin D intake with supplementation where necessary lead to increases in peak bone mass. The best sources of dietary calcium are dairy products and calcium fortified juices. The best source of vitamin D is milk.
- Weight bearing physical activity is an important factor in achieving an optimal peak bone mass and maintaining bone mass in adults; this is especially important in adolescent girls who are accumulating bone mass.
- A good general nutrition as per Canada's Food Guide, also promotes healthy bones.

Recommended Calcium Intakes for Individuals		Health Canada (2001)
Life Stage Group	**Calcium (mg)**	**Vitamin D (IU)**
Birth–6 months	210	200
7–12 months	270	200
1–3 years	500	200
4–8 years	800	200
9–18 years	1300	200
19–50 years	1000	200
51–70 years	1200	400
> 70 years (plus)	1200	600
Pregnancy and Lactation		
≤ 18 years (or younger)	1300	200
19–50 years	1000	200

Quick Guide to Calculating Dietary Calcium Intake

300 mg for each serving for the following:

- 1 cup of milk (any milk, including skim, chocolate, powdered)
- 3/4 cup yogurt
- 1 chunk of cheese (size of a half deck of cards)
- 2 cheese slices
- 1 cup of soya milk
- 1 cup of calcium fortified orange or grapefruit juice
- 3/4 cup milk with 35% more calcium

Add 300 mg for the calcium contained in the rest of the diet (provided the patient is eating an average, well balanced diet).

If unable to consume correct amounts, consider suggesting calcium and vitamin D supplements. Supplements should have a drug identification number (DIN).

Calcium supplements:

- are best absorbed in frequent small quantities
- are best absorbed when taken with food

Vitamin D Sources/Supplements:

- milk 1 cup – 100 international units (IU)
- halibut liver oil – 400 IU
- multi-vitamin – 400 IU
- pure vitamin D – 400 and 1000 IU
- no more than 5000 IU of vitamin A should be taken daily (Fish oils such as halibut liver oil are high in vitamin A).

Identification of Risk Factors to Prevent Falls

Falls are both predictable and preventable. Personal risk factors associated with falls, particularly with the elderly operate in an additive way. The likelihood of a fall increases with the number of risks associated with an individual.

Falls are especially dangerous for people who are unaware that they have low bone mass as they are at a high risk of fracture. The principles of rehabilitation with special focus to strengthening lower extremities and improving balance may be helpful. Those that are at high risk for falls may benefit from the use of hip protectors.

Risk factors for falls:

- Advanced age
- Neurological conditions: e.g. CVA, Parkinson's Disease
- Impaired cognition and balance
- Slow gait and diminishing reflexes
- Poor vision
- Loss of muscle mass
- Foot problems or inappropriate footwear
- Medications may cause falls, such as Benzodiazepines, Antidepressants (even non-sedating ones), Antihypertensives that cause postural hypotension.
- Environmental hazards: scatter rugs, electric wires and poor lighting, reaching for household items on top of shelves, climbing on chairs or boxes to reach a specific item, slippery or wet floors.

Issued 04/02

Appendix F

Recommended Pharmacare Revisions

Proposed Revised criteria (Recommended revision to the existing N.S. Pharmacare restriction criteria by the Provincial Osteoporosis Committee, Sept, 2001)

Alendronate (Fosamax 10 mg, 40 mg tablet)

- for the treatment of osteoporosis associated with documented fragility fracture (with low impact) even in the absence of bone mineral density (BMD) measurements
- for the treatment of osteoporosis without documented fractures when patients have BMD measurements of -2.5 or lower at the spine (L2-L4) or at the hip (excluding Ward's area)
- for the treatment of conventional x-ray documented osteopenia/demineralization only in patients without access to BMD measurements*
- as prophylaxis of corticosteroid induced osteoporosis in patients expected to receive oral corticosteroid therapy for 3 months or more
- for the treatment of Paget's disease of bone (6 month limit)
- other requests reviewed on case by case basis

Risedronate (Actonel 5 mg tablet, 30 mg tablet)

- for the treatment of osteoporosis associated with documented fragility fracture (with low impact) even in the absence of bone mineral density (BMD) measurements
- for the treatment of osteoporosis without documented fractures when patients have BMD measurements of -2.5 or lower at the spine (L2-L4) or at the hip (excluding Ward's area)
- for the treatment of conventional x-ray documented osteopenia/demineralization only in patients without access to BMD measurements*
- as prophylaxis of corticosteroid induced osteoporosis in patients expected to receive oral corticosteroid therapy for 3 months or more
- Paget's disease of bone (2 month limit, one re-treatment course may be considered)
- other requests reviewed on case by case basis

Raloxifene (Evista 60 mg)

- for the treatment of postmenopausal osteoporosis associated with documented fragility fracture (with low impact) even in the absence of bone mineral density (BMD) measurements
- for the treatment of postmenopausal osteoporosis without documented fractures when patients have BMD measurements of -2.5 or lower at the spine (L2-L4) or at the hip (excluding Ward's area)
- for the treatment of conventional x-ray documented osteopenia/demineralization only in women without access to BMD measurements*
- other requests reviewed on case by case basis

Synthetic calcitonin (salmon) nasal spray (Miacalcin 200 IU)

- for the treatment of osteoporosis associated with documented fragility fracture (with low impact) even in the absence of bone mineral density (BMD) measurements and alendronate, risedronate and raloxifene are not tolerated or contraindicated
- for the treatment of osteoporosis without documented fractures when patients have BMD measurements of -2.5 or lower at the spine (L2-L4) or at the hip (excluding Ward's area) and alendronate, risedronate and raloxifene are not tolerated or contraindicated
- for the treatment of conventional x-ray documented osteopenia/demineralization only in patients without access to BMD measurements* and alendronate, risedronate and raloxifene are not tolerated or contraindicated
- as prophylaxis of corticosteroid induced osteoporosis in patients expected to receive oral corticosteroid therapy for 3 months or more and alendronate and risedronate are not tolerated or contraindicated
- pain associated with osteoporotic fragility fractures, bone metastases, pathological fractures (short term up to 3 months)
- other requests reviewed on case by case basis

* Ideally, radiologist's comment of osteopenia or demineralization on any x-ray report warrants further assessment with BMD measurement. However, since there is evidence to show that once osteopenia is visible on conventional x-ray that bone is usually decidedly osteoporotic (BMD of -2.5 or lower), conventional x-ray can be used to recommend treatment if BMD is not accessible.

Appendix G

Bone Densitometry Accreditation Program

CAR

CANADIAN
ASSOCIATION OF
RADIOLOGISTS

BONE DENSITOMETRY ACCREDITATION PROGRAM

1740 COTE VERTU, VILLE ST-LAURENT, QC - TEL: (514) 738-3111 FAX: (514) 738-5199

Bone Densitometry
Accreditation
Program

Dear Doctor:

As per your request, enclosed you will find detailed information regarding the Canadian Association of Radiologists (CAR) Bone Densitometry Accreditation Program.

Enclosures include the following:

1.	Initial letter to applicants	p. 1-2
2.	Background Document - Facility Accreditation	p. 3-4
3.	Legal release forms	P. 5-6
4.	Questionnaire	P. 7-11
5.	Case Examples	p. 12
6.	Appendices	P. 13-18
7.	References	p. 19
8.	CAR Standards	

Bone Densitometry
Accreditation
Program

SUBJECT: Bone Densitometry Accreditation Program

Thank you for your recent inquiry regarding the Bone Densitometry Accreditation Program of the Canadian Association of Radiologists. The program has been designed to be educational and evaluates qualification of personnel, equipment performance, effectiveness of quality control measures. These are the primary factors to impact the quality of patient care. It is a peer review, educationally-focused evaluation of Bone Densitometry practice. Enclosed are the questionnaire, legal forms and all relevant documents which must be completed and returned with the survey fees.

You will also find enclosed a reference document "Background Document - Facility Accreditation" which includes critical requirements and has been developed to ensure the attainment of minimal standards in the practice of densitometry.

The legal form (page 5) must be signed by the duly authorized representative of the center; page 6 must be signed by all physicians involved in the BMD program. The fee* for the survey which is payable to the Canadian Association of Radiologists is $ 400.00 Canadian GST included **(PST if applicable should be added- province of Quebec only)** for one unit. If you have more than one unit at the same facility, the fee is $ 600.00 Canadian GST included **(PST if applicable should be added- province of Quebec only).**

The five-page Application for Accreditation in Bone Densitometry must be accurately completed. If more space is needed for listing personnel, equipment or quality control activities, please copy those pages as required. You also have to submit copies of licenses for all technologists and the list of Continuing Medical Education for all personnel involved for a bone densitometry exam (physicians and technologists).

The fee and completed questionnaire should be returned to:

The Canadian Association of Radiologists
1740 Cote Vertu
St-Laurent, Quebec, H4L 2A4

and clearly marked, "Bone Densitometry Accreditation".

*** Prices subject to change without notice.**

The facility must submit from each bone densitometry unit - as part of Quality Assurance Evaluation - the printing of Quality Control curves for BMD-BMC-AREA for the last six months, the precision data and the quality assurance data. Also, printouts of phantom scans for one calendar month in the last calendar year must be submitted.

Original printouts of BMD exams and reports will also be evaluated by the Committee for BMD Accreditation. The facility must submit original printouts of 3 AP spine scans, 3 proximal femur (hip) scans, 3 total body scans and 3 other examinations most commonly done at your centre. One comparison study must be included among the above. Reports must be submitted with printouts. Also, one example of a BMD report per physician must also be submitted for evaluation.

You will find enclosed some case examples (4) on which you will have to submit a report that would be directed to a family physician **not a specialist in osteoporis.**

A review panel will evaluate all the documents and render a final report for accreditation.

Successful applicants will be accredited for a period of three years and receive a certificate for each BMD unit which is accredited. Notification of the accreditation will be published in the Canadian Association of Radiologists Journal. Facilities not passing the review will be notified and recommendations will be made.

This unique program offers physicians an opportunity for review and evaluation of their Bone Densitometry unit, personnel qualifications, exam quality, report accuracy, quality control procedures by a peer review mechanism. It is a voluntary program administered by the Committee on Bone Densitometry Accreditation of the Canadian Association of Radiologists. The survey is essentially conducted by mail but the Committee reserves the right to conduct an on-site review at any time.

We sincerely hope that you will participate. If you have any questions please call the Canadian Association of Radiologists at (514) 738-3111 extension 202 or 206.

Bone Densitometry
Accreditation
Program

Canadian Association of Radiologists
Bone Mineral Densitometry
Background Document - Facility Accreditation

Introduction:

The accreditation program has been developed to ensure the attainment of minimal standards in the practice of densitometry.

Unlike the majority of diagnostic imaging procedures bone densitometry is not done to arrive at a diagnosis. Rather bone mineral densitometry is the single most powerful predictor of fracture risk in persons suspected of having osteoporosis. Its use is, therefore, in risk assessment. In this it is more analogous to a serum cholesterol determination in the context of a vasculopathy than it is to, say, a chest radiograph in a person with an intractable cough or a CT brain examination in a person with headaches. These are examinations with a bimodal output (rule-in or rule-out disease). Because the technique is quantitative rather than qualitative there is a relatively greater need to ensure that standards are met and quality control procedures are in place.. Equally, because the technique is only part of a clinical risk assessment it is necessary for a physician to demonstrate some knowledge of osteoporosis as a disease and not merely its radiological assessment.

Accreditation

Much of the information required for accreditation is routine. The following are seen as the critical requirements (and information is appended to help you meet them):

1. Personnel

For accreditation by the Canadian Association of Radiologists, it is required that the physician involved in the performance, supervision and interpretation of bone densitometry meet the following minimum criteria:

- Be certified by the Royal College of Physicians and Surgeons of Canada or by the Collège des médecins du Québec as a specialist.

AND

- Be certified by the International Society for Clinical Densitometry (ISCD) or an alternative training of at least one day education.

The technologist must have Canadian Association of Medical Radiation Technologists (CAMRT) certification or the equivalent provincial license. The technologist must also have specific training in bone densitometry (ISCD course or its equivalent).

2. Quality Assurance

As part of a routine quality programme you are expected to have a phantom - either the European or Hologic models - and use this to track machine performance. The technologist should have explicit instructions about a threshold (Shewhard rules, or other construct) at which to alert service and clinical staff.

3. Inter-machine Calibration

You are expected to have and document an explicit policy concerning repeat examinations to ensure that systematic errors due to different machines, or the same machines before and after servicing and tube and software changes, are compensated for. Also, at least annually, equipment performance should be monitored and a quantitative dose determination must be conducted by a qualified medical physicist.

4. Determination of Precision

Follow-up studies require that the specific precision of your machine(s) has or have been determined using standard protocols (Appendix 1). This is necessary for interpretations about positive or adverse changes in bone density. You are expected to document your data in this respect. Appendix 2 details software which may be used to simplify the calculation of your machine precision error. Manufacturers data are **not** an acceptable alternative being quoted in percentages and ignoring machine-specific characteristics.

5. Reporting

You are required to provide examples of reporting to physicians, by you and your colleagues, to serve as documentation of your understanding of the classification of osteoporosis and the role of densitometry in risk assessment. A document representing a consensus about the components of a satisfactory report is appended (Appendix 3).

References are enclosed (page 19).

CENTER'S PARTICIPATION FORM AND RELEASE (SURVEY AGREEMENT)

I am the duly authorized representative of the _____ (name of Center) (hereinafter the "Center"), which is the owner and/or a user of the equipment.
I am authorized to subscribe to the present agreement in order to permit the accreditation, by the Canadian Association of Radiologists (hereinafter "CAR"), of all or some of the equipment used by the Center for purposes of Bone Densitometry.

The Center wishes to participate in an accreditation program whose objectives are to evaluate the quality of professional services rendered and of the equipment used in the area of Bone Densitometry, and to give its accreditation to physicians who wish to enroll and to the equipment used for such purposes.

Accreditation may be given to certain equipment used by the Center that, in the opinion of CAR, satisfies the standards of excellence recognized by CAR.

The Center requests that CAR evaluate the equipment of Bone Densitometry. For this purpose, the Center authorizes site inspection visit(s) at the following mentioned address, as well as external evaluation by persons designated by CAR of certain files and exams selected by the representative or the CAR reviewer, to verify and evaluate the quality of the exams, the efficacy of the equipment used, and the reliability of the imagery.

The Center agrees to adhere to the judgment to be formed by CAR in the context of this accreditation program. The Center releases CAR, as well as its officers, reviewers and representatives, from any liability for damages that may result from the implementation or non-implementation of this program.

The Center releases CAR from any liability and undertakes not to exercise any recourse against CAR, its officers, reviewers or representatives for the acts or omissions that may occur, and more particularly in the event of a legal proceeding instituted against the Center, one of the professionals working therefor and/or CAR for services rendered at the Center accredited by CAR.

It is understood that in adhering to the accreditation program in the area of Bone Densitometry organized by CAR, the Center does not undertake, towards CAR, to dispense and offer services in this area.

Address : _____
_____

_____
(Date)

_____
(Printed name)

_____
(Signature of duly authorized representative of Center)

PARTICIPATION FORM AND RELEASE

As a physician practicing at the _____ **(name of Center)** (hereinafter the "Center"), I wish to participate in the accreditation program in the area of Bone Densitometry of the Canadian Association of Radiologists (hereinafter "CAR").

I am aware of the objectives of CAR's accreditation program, and I subscribe to them and agree to fully cooperate with CAR in this respect.

I wish to participate in the accreditation program, whose objectives are to evaluate the quality of professional services rendered and of the equipment used in the area of Bone Densitometry as well as to give its accreditation to the physicians who wish to enroll and to the equipment used for such purposes.

Accreditation may be given to certain individual physicians and/or to equipment used which, in the opinion of CAR, satisfies the standards of excellence recognized by CAR.

I request that CAR evaluate my services in the area of Bone Densitometry. For this purpose, I authorize site inspection visit(s) at the following mentioned address, as well as external evaluation by persons designated by CAR of certain files and exams selected by the representative or the CAR reviewer, to verify and evaluate the quality of the exams, the efficacy of the equipment used, and the reliability of the imagery.

I agree to adhere to the judgment to be formed by CAR in the context of this accreditation program. I release CAR, as well as its officers, reviewers and representatives, from any liability for damages that may result from the implementation or non-implementation of this program.

I release CAR from any liability and undertake not to exercise any recourse against CAR, its officers, reviewers or representatives for the acts or omissions that may occur, and more particularly in the event of a legal proceeding instituted against the Center, one of the professionals working therefor and/or CAR for services rendered at the Center accredited by CAR.

It is understood that in adhering to the accreditation program in the area of Bone Densitometry organized by CAR, I do not undertake, towards CAR, to dispense and offer services in this area.

Address : _____

_____

_____

(Date)

_____

(Printed name)

_____

(Signature of physician)

PRIVILEGED AND CONFIDENTIAL
PEER REVIEW INFORMATION

FACILITY SETTING

NAME:	
ADDRESS:	
CITY, PROVINCE:	
POSTAL CODE:	
TELEPHONE:	
FAX NO:	
CHIEF (BMD):	

Type of practice location for which accreditation is sought:	
	( ) Private radiology office
	( ) Hospital
	( ) Other (specify)
Type of procedures performed in this location:	
	( ) Central Type (specify):
	( ) Other type (specify):

CAR

FACILITY NO: _____

PERSONNEL CERTIFICATION AND EXPERIENCE

NAME	CERTIFICATION & TRAINING IN BMD	# of years of experience (BMD)	# of procedures done yearly	Specialty & Licensing Body ***
	( ) Certification Year: _____ ( ) Training in BMD ( ) ISCD or Other (specify): _____			
	( ) Certification Year: _____ ( ) Training in BMD ( ) ISCD or Other (specify): _____			
	( ) Certification Year: _____ ( ) Training in BMD ( ) ISCD or Other (specify): _____			
	( ) Certification Year: _____ ( ) Training in BMD ( ) ISCD or Other (specify): _____			
	( ) Certification Year: _____ ( ) Training in BMD ( ) ISCD or Other (specify): _____			
	( ) Certification Year: _____ ( ) Training in BMD ( ) ISCD or Other (specify): _____			

*** FOR NUCLEAR MEDICINE (1) PHYSICIAN (2) OTHER (specify) (5): _____
RADIOLOGIST (3) X-RAY TECHNOLOGIST (4)

FOR EACH INDIVIDUAL, PLEASE SUBMIT LISTING AND COPIES OF CERTIFICATES FOR TRAINING IN BONE DENSITOMETRY.

FACILITY NO: _____

EQUIPMENT INFORMATION

	UNIT 1	UNIT 2
MANUFACTURER:		
MODEL:		
YEAR MANUFACTURED:		
SOFTWARE:		
DATE OF LAST UPGRADE:		

UNIT SERVICE (include copy)

YEARLY REPORT DONE BY A PHYSICIST:	( ) YES ( ) NO
HAVE YOU RECORDED MACHINE SERVICE IN THE LAST YEAR, IF SO, WHAT HAVE YOU DONE WITH DATA:	

CAR

REPORTING MECHANISM
(include copies)

WHAT IS YOUR POLICY ABOUT REQUESTING RADIOGRAPHS:	
IS A PATIENT QUESTIONNAIRE INCLUDED IN YOUR REPORT?	
IS THE WEIGHT AND HEIGHT NOTED AT EACH VISIT?	
DO YOU KEEP ARCHIVE OF YOUR DATA:	

QUALITY CONTROL

PHANTOM TYPE:	SERIAL NUMBER:
SPINE:	
HIP:	
TISSUE BAR:	
BLOCK PHANTOM:	
E.S.P.:	
OTHER (specify):	

CAR

EVALUATION

Questionnaire
Printing of Quality Control (curves of BMD-BMC-AREA for the last six months) Precision Data Quality Assurance Data
Printouts of phantom scans for one calendar month in the last calendar year
Original Printouts of 3 AP spine scans with reports
Original Printouts of 3 proximal femur (hip) scans with reports
Original Printouts of 3 Total Body scans with reports (if applicable)
Original Printouts of 3 other examinations that you commonly do (if applicable) (if you do pediatric exams, they must be submitted) with reports One comparison exam among the above
Report from each physician
4 Reports for Case Examinations (Page 11)

CHECKLIST

FEES		
- Facility with one unit	- $ 400.	
- More than one unit	- $ 600.	GST included, PST if applicable should be added (Quebec only)
Legal Form		
Copy of current licenses for technologists		
List & Copies of certificates for Training in Bone Densitometry for personnel		

Case Examples

Standardized Examinations

Three standardized examinations are provided on which you are asked to provide a report directed to a family physician, not a specialist in osteoporosis. These have been selected to allow you to reveal your understanding of:
a) The distinction between low peak bone mass and bone loss;
b) The scope of the WHO classification of osteoporosis;
c) The limitations of DXA machines in terms of bodily habitus; and,
d) The role of radiographically demonstrated fracturing vis a vis densitometric risk assessment.

Case Examples

In your clinic or hospital how will your policies deal with and how will you report examinations made given the following scenarios:

1. An examination of the lumbar spine examination in a very obese patient. Similarly you are interpreting lumbar spine examination in a women whose height measures 120 cm. Do these scenarios require comment?

2. Examinations of the lumbar spine and proximal femur in a 22-year-old woman treated with glucocorticoids. How soon might you consider a repeat examination and why?

3. An examination of the lumbar spine and proximal femur in a 58-year-old Asian women with a family history of osteoporosis. Her T-score is -1.3. What caveats might you introduce in your reporting of this T-score?

4. An examination of the lumbar spine in a 68-year old woman. The T-score (L2-4) is -1.9 but on the image L1 is fractured. What opinion do you provide?

You may be helped in this by reading the Appendix 3.

APPENDIX 1
PRECISION

TO CALCULATE PRECISION....

A precision study should be done for all scan types at least once and thereafter if a new technician is hired or if there is a major equipment change.

To determine the precision of any one scan type, you should scan:

- 1 patient 28 times
- 14 patients 3 times each or
- 27 patients 2 times each

The patient must be repositioned between each study. All scans of any 1 type should be completed within 1 week for a short-term precision study.

The following illustrates how to calculate the short-term precision for AP spine studies in which 14 patients were scanned 3 times each within the space of 1 week.

The individual values and the average value for each of the 3 scans on patients 1 through 14 are shown in the following table:

PATIENT	SCAN 1	SCAN 2	SCAN 3	MEAN (X)
Patient 1	1.010	1.019	1.100	1.043
Patient 2	0.925	0.940	0.918	0.928
Patient 3	1.164	1.160	1.170	1.165
Patient 4	0.999	1.010	1.008	1.006
Patient 5	0.900	0.920	0.905	0.908
Patient 6	0.955	0.960	0.960	0.958
Patient 7	1.000	1.010	1.150	1.053
Patient 8	0.875	0.849	0.869	0.864
Patient 9	0.898	0.920	0.901	0.906
Patient 10	1.111	1.009	1.100	1.073
Patient 11	0.964	0.949	0.960	0.958
Patient 12	1.000	0.985	0.992	0.992
Patient 13	1.200	1.185	1.205	1.197
Patient 14	1.165	1.170	1.180	1.172

In all, you have performed 42 AP spine studies (14 X 3 = 42).

Step 1.

Calculate the mean(X) or average BMD for each of the 14 patients by adding each of the three measurements and dividing by 3. For patient 1, the calculation would be:

$$(1.010 + 1.019 + 1.100) / 3 = 1.043$$

Step 2.

Then find the standard deviation (SD) for this set of data (the three scans on patient 1) using the formula:

$$SD = \sqrt{\sum_{i=1}^{n} \frac{(x_i - x)^2}{n-1}}$$

This means 1)subtract each of the 3 measurements from the average BMD for the 3 measurements, 2)square each of the 3 resulting differences and 3)add the 3 squared differences. Next, 4)divide the sum of the 3 squared differences by the number of measurements minus 1 (or 3-1 = 2 in this case) and finally 5) take the square root. So for patient 1, the calculation for the SD is as follows:

$$SD_{pt.1} = \sqrt{\frac{(1.010-1.043)^2 + (1.019-1.043)^2 + (1.100-1.043)^2}{3-1}}$$

$$SD = 0.050 gm/cm^2$$

The precision for patient 1 can be expressed as the SD in gm/cm^2 or as the coefficient of variation (CV) which is defined as:

$$CV = SD/mean$$

For patient 1,

$$CV = \frac{0.050 gm/cm^2}{1.043 gm/cm^2}$$

$$CV = 0.0479$$

In order to express the CV as a percentage, simply multiply by 100. In this case the %CV would be 4.79%.

Step 3.

The mean or average BMD, the SD and CV or %CV should be calculated for each of the remaining 13 patients.

Step 4.

Then you must calculate the precision for the entire group as either the SD or the CV (or %CV) which is done by finding the root-mean-square average (RMS) for the 14 subjects. To calculate the RMS average SD use the following formula:

$$SD = \sqrt{\sum_{j=1}^{m} SD_j^2 / m}$$

First, take each of the 14 SD's you calculated and square them. 2)Add up all 14 squared SD's and 3) divide the sum by m, the number of patients or 14. Next, 4) take the square root. This is the SD for the entire group in gm/cm^2 and is your precision for the entire group.

For these 14 patients, the calculation of the RMS average SD is as follows:

$$SD = \sqrt{\frac{[(0.025)^2 + (0.011)^2 + (0.005)^2 + (0.006)^2 + (0.01)^2 + (0.002)^2 + (0.001)^2 + (0.014)^2 + (0.012)^2 + (0.034)^2 + (0.008)^2 + (0.003)^2 + (0.010)^2 + (0.008)^2]}{14}}$$

$$SD = 0.031 gm/cm^2$$

To find the CV for the entire group, use the following formula:

$$CV = \sqrt{\sum_{j=1}^{m} CV_j^2 / m}$$

First 1) square each of the 14 CV's which you have previously calculated and then 2) add the 14 squared CV's. Next, 3) divide the sum by 14 and last 4) take the square root. This is the CV for the entire group. To express it as a percentage, simply multiply by 100.

It is appropriate to state the SD, CV or % CV and the average BMD for the entire group when discussing precision. The average BMD for entire group of 14 patients is found simply by adding all 42 values and dividing by 42. This value is 1.016 gm/cm^2. The reason that the average BMD for the group should be stated is that your precision will not be as good in osteopenic or osteoporotic populations as it is in normal populations. When your precision is expressed as a CV, part of the poorer precision in osteopenic groups is simply a function of the denominator being smaller (in the calculation of the CV). Part of the poorer precision is also real however. Most authorities agree that precision should be expressed as the SD in gm/cm^2 rather than as a CV or %CV and that the average BMD of the study population should be given.

Gluer CC, Blake G, Lu Y, Blunt BA, Genant HK. Accurate assessment of precision errors: how to measure the reproducibility of bone densitometry techniques. Osteoporosis Int 1995;5:262-270.

PRECISION CALCULATOR 3.0

New and Improved Version 3.0 includes:

- Easier User Interface
- Printable Report
- Updated User's Guide
- Automatically computes
  - ⇒ precision error
  - ⇒ minimum significant change

DETERMINE THE PRECISION ERROR OF YOUR BONE DENSITOMETER

Determines precision error according to International Society for Clinical Densitometry (ISCD) recommendations

Compatible with Windows 95 and 98

Comes with User's Guide which describes steps for :

- Installing and running the program
- Performing a precision experiment
- Evaluating significance between measurements

Please send me _____ Precision Calculators at $34.95 each (plus $5.00 shipping and handling per order)

Name: _____

Street address: _____

City: _____

State/Province: _____ Zip: _____

Telephone: _____

Return this form with check made payable to **SGF Enterprises** (no credit card orders accepted) to:

Precision Calculator
SGF Enterprises
2610 Lexington Terrace
West Linn, Oregon 97068 USA

email: preccalc@aol.com
website: http://members.aol.com/preccalc

APPENDIX 3
REPORT

ANATOMY OF A BONE DENSITOMETRY REPORT

1. Estimations of bone mineral density in both the lumbar spine (L1 - L4) - antero-posterior or lateral - and proximal femur (total hip) shall be made and reported.

2. Bone density should be reported only to two decimal places in gm/cm2 for each skeletal site measured.

3. Both T score and Z score are to be provided for each skeletal site assessed.

4. When quantitative lifetime fracture risk data are available, these will be used, until such time, T-scores will be used.

   Bone densitometry should not be expressed in terms of "skeletal age".

5. For current practical use, and until better validated algorithms have been developed, the World Health Organization classification system may be applied to both sexes and to all individuals over thirty. It should be noted that such use represents an extrapolation from the original data gathered in postmenopausal women.

   Recommend goal of using absolute bone densities in relation to standardized regions (Sbmd) based on total hip or total spine.

6. Changes in density on repeat measurement should be reported by each site in both gm/cm2 and percentage change. The statistical significance of a change in density should be noted based on machine *in vivo* precision data.

7. Transformed and applied bone density determinations should be specific to racial background when available. Make note of database used.

8. Confounding variables and findings should be noted, and specific comments should be made when bone morphology is abnormal.

9. Significantly raised bone density should be noted as a distinct diagnostic category.

* Note that percentage change refers to raw data not T-score.

REFERENCES

1. Lu Y, Mathur AK, Blunt BA, et al. Dual x-ray absorptiometry quality control: comparison of visual examination and process-control charts. J Bone Miner Res 1996; 11: 626 - 637.

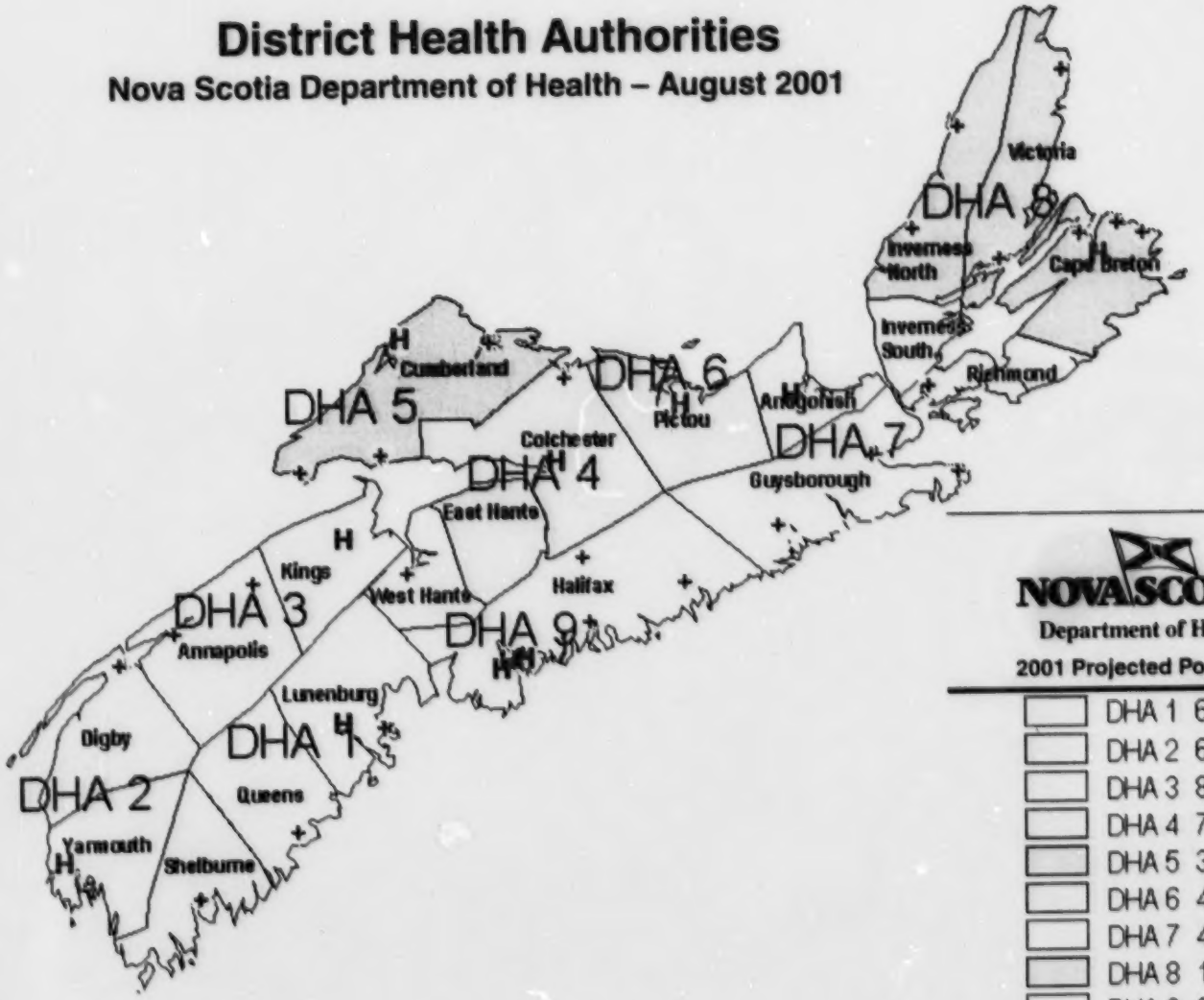
2. Gluer CC, Blake G, Lu Y, et al. Accurate assessment of precision errors: how to measure the reproducibility errors of bone densitometry techniques. Osteoporosis Int 1992; 2: 146 - 152

Appendix H

District Health Authorities
2001 Projected Population

District Health Authorities

Nova Scotia Department of Health – August 2001



NOVA SCOTIA
Department of Health

2001 Projected Population

DHA 1	61,071
DHA 2	64,450
DHA 3	84,626
DHA 4	73,365
DHA 5	33,785
DHA 6	48,825
DHA 7	48,189
DHA 8	134,462
DHA 9	389,712

Projected Nova Scotia Population for 2001
by District Health Authority
by Age Group

	DHA1		DHA2		DHA3		DHA4		DHA5		DHA6		DHA7		DHA8		DHA9	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
AGE	30195	30876	31722	32728	41884	42742	36463	36902	16496	17289	23846	24979	23912	24277	65166	69296	191052	198660
0 to 4	1281	1201	1530	1494	2216	1990	1949	1764	828	733	1218	1142	1109	1145	3302	3089	10981	10073
5 to 9	1693	1538	1989	1827	2712	2506	2453	2360	960	885	1427	1354	1435	1379	4093	3753	12963	11893
10 to 14	1982	1804	2103	1994	3021	2957	2679	2523	1044	1029	1591	1527	1736	1682	4745	4515	13418	12810
15 to 19	2035	1871	2106	2140	2939	2848	2629	2465	1164	1121	1785	1775	1980	1866	5087	4881	12601	12158
20 to 24	1955	1946	2187	2113	2794	2769	2669	2327	1127	1060	1868	1776	1954	1860	5020	5126	12039	11847
25 to 29	1654	1536	1946	1802	2455	2417	2246	2410	1017	955	1564	1428	1517	1397	3913	3734	14424	14613
30 to 34	1866	1770	2223	2041	2658	2558	2372	2408	1019	960	1458	1464	1401	1338	3542	3573	15666	15610
35 to 39	2346	2318	2638	2506	3866	3637	3183	3099	1212	1207	1672	1764	1617	1668	4412	4839	18106	18192
40 to 44	2579	2589	2579	2592	3814	3649	3123	3169	1278	1277	1953	1926	1780	1844	5182	5553	17162	17841
45 to 49	2441	2433	2339	2349	3012	3069	2940	2911	1297	1266	1922	1947	1818	1816	5198	5237	14946	15974
50 to 54	2387	2386	2336	2305	2963	2904	2635	2536	1192	1232	1864	1875	1868	1774	5120	5036	13538	14120
55 to 59	1916	1910	1864	1874	2242	2398	2007	1933	981	996	1444	1390	1416	1436	3823	3963	10197	10422
60 to 64	1575	1647	1498	1545	1954	2015	1553	1685	959	908	1078	1098	1164	1136	3275	3439	7286	7764
65 to 69	1357	1500	1260	1407	1757	1780	1391	1391	721	885	910	983	990	1008	2762	3116	6165	6569
70 to 74	1212	1369	1067	1379	1400	1615	1041	1226	659	790	774	989	807	898	2249	2817	4670	5900
75 to 79	889	1150	908	1296	1026	1356	802	1083	512	760	624	912	587	787	1639	2593	3393	5248
80 to 84	594	978	668	1025	614	1102	485	855	321	609	410	814	447	596	1064	2101	2226	3852
85 to 89	314	579	361	677	298	751	221	518	160	403	201	516	225	395	556	1229	903	2311
90 to ...	119	351	120	362	143	421	85	239	45	213	83	299	61	252	184	702	368	1463

[2001 PROJECTION] [NOVA SCOTIA] [AGE] [SEX] population.ppr of population (Reporter)05/03/2001
S:\research\Population\population.mdc

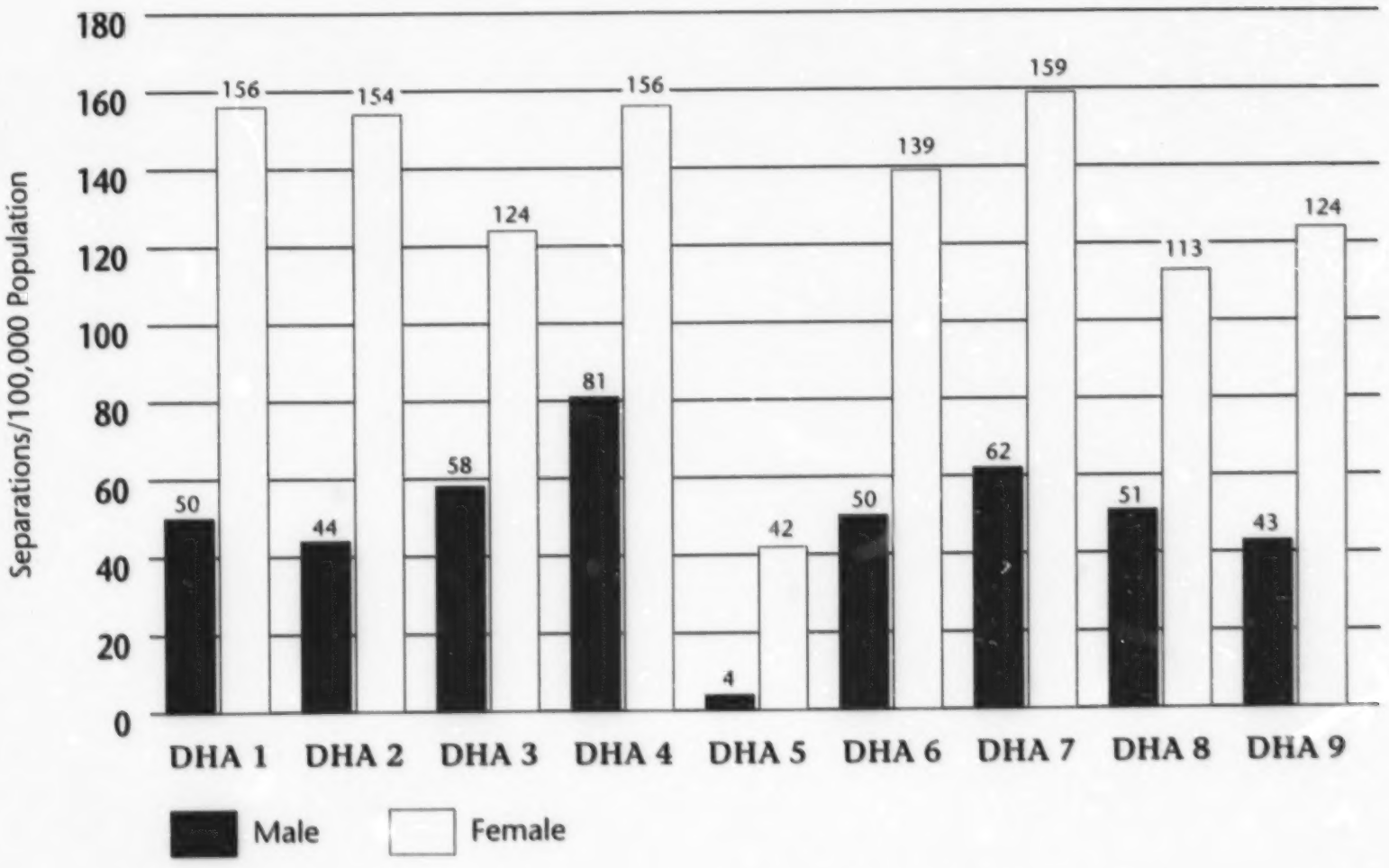
Appendix I

Total Hip Fractures by DHA of Residence (Age and Sex)

Standardized (2000–2001)

- **Male and Female**
- **Age 65+**

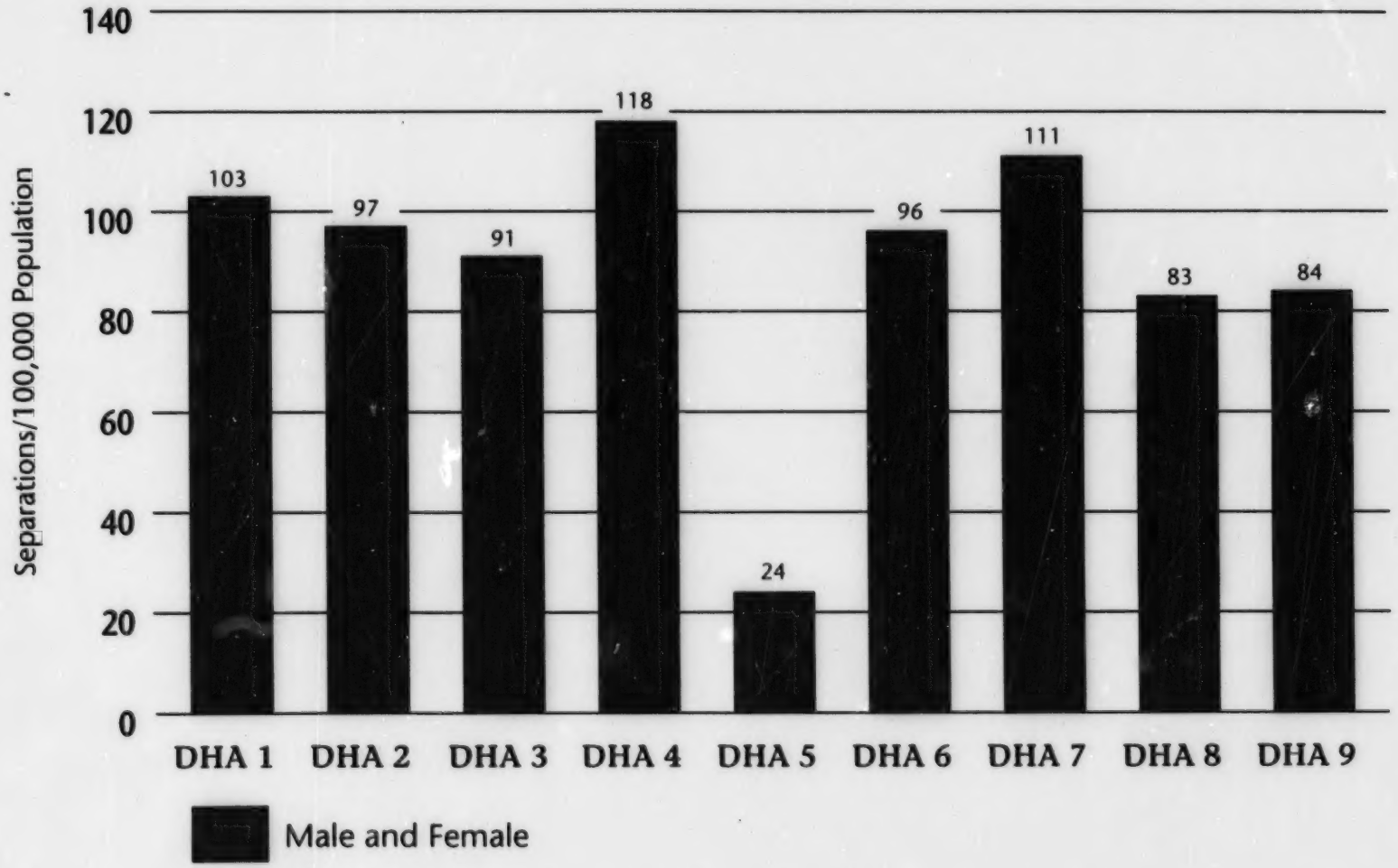
Total Hip Fractures by DHA of Residence
Fiscal 2000/01 (exclude transport accidents)
Age and Sex Standardized to the 1991 Canadian Population



2001/11/06

Performance Measurement & Health Informatics

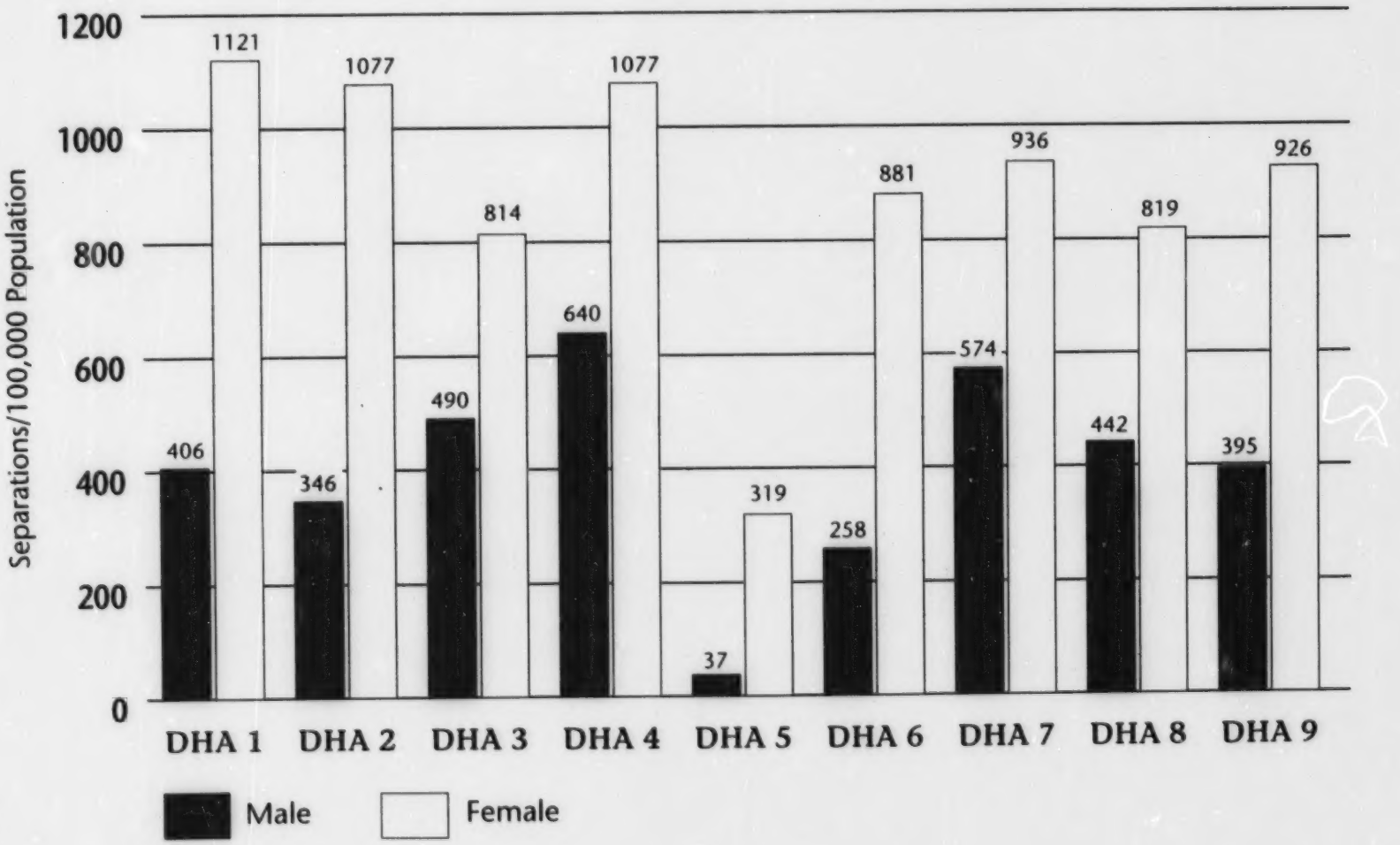
Total Hip Fractures by DHA of Residence
Fiscal 2000/01 (exclude transport accidents)
Age and Sex Standardized to the 1991 Canadian Population



2001/11/06

Performance Measurement & Health Informatics

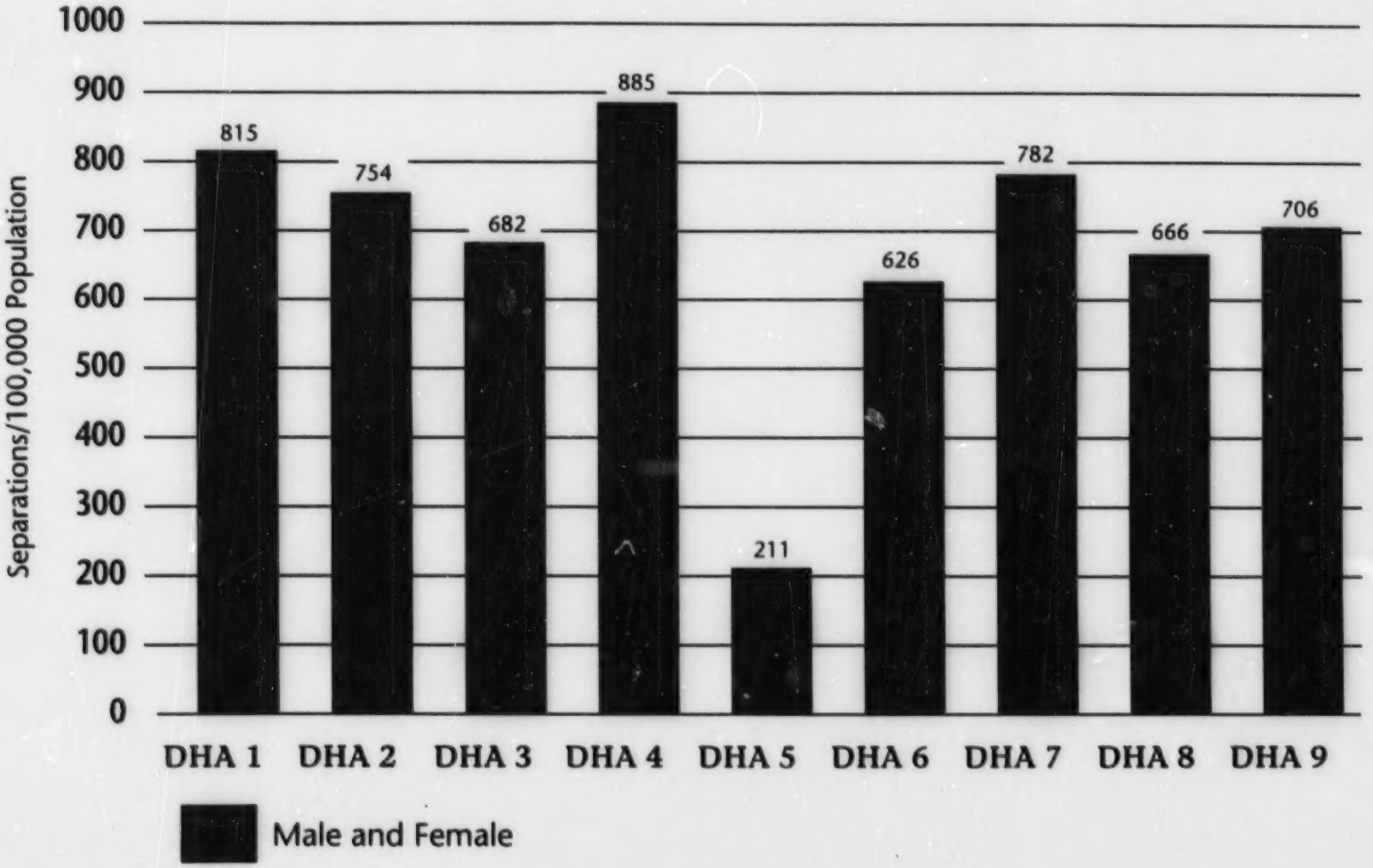
Total Hip Fractures Age 65+ by DHA of Residence
Fiscal 2000/01 (exclude transport accidents)
Age and Sex Standardized to the 1991 Canadian Population



2001/11/06

Performance Measurement & Health Informatics

Total Hip Fractures Age 65+ by DHA of Residence
Fiscal 2000/01 (exclude transport accidents)
Age and Sex Standardized to the 1991 Canadian Population



2001/11/06

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